

04 Operating a Resilient, Low-Carbon Footprint Campus

This chapter covers our carbon emissions and resource use, as we begin our first year of reporting at Punggol Campus.

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Commitment

We strive to reduce the environmental footprint of our operations while fostering a culture of environmental consciousness among SITizens and employees.

Impact Highlights at a Glance

Target

Set up a **mangrove conservatory** by 2027

Develop and implement an **action plan for greening laboratories** by 2027

Conduct **waste audit** by 2027

Decarbonisation and Climate Resilience

In FY2025

35 tCO₂e
Scope 1 GHG Emissions

12,492 tCO₂e
Scope 2 GHG Emissions

5,409 tCO₂e avoided
by utilising district cooling

2,182 MWh
renewable energy generated

All buildings certified **BCA Green Mark Platinum, including having 2 Super Low Energy buildings**

Certifications and Awards for Punggol Campus



Resource Use

In FY2025

138.1 kWh/m²
Energy Utilisation Index (EUI)

14.8 m³/person
Water Efficiency Index (WEI)
• Rainwater harvesting across **40%** of Punggol Campus land area

21.4 kg/person
Waste Disposal Index (WDI)
• **39,786 kg** of waste recycled / composted

Building greener from the ground up

For more than a decade, SIT had been operating from 6 locations: Dover campus and satellite locations within each of the 5 local Polytechnics — Nanyang Polytechnic (NYP), Ngee Ann Polytechnic (NP), Republic Polytechnic (RP), Singapore Polytechnic (SP) and Temasek Polytechnic (TP).

FY2024 and FY2025 were pivotal years when we moved in phases from the 6 campus locations to Punggol Campus, while keeping operations running smoothly throughout the 2 years of transition.

In May 2025, we completed the move to Punggol Campus – our new purpose-built, fully integrated home. Sustainability was woven into the Punggol Campus story from the very beginning, shaping design decisions, guiding construction, and today, influencing our day-to-day operations.

Our environmental footprint begins from embodied carbon — the emissions associated with construction materials which represent a significant one-time carbon investment in any new development. To better understand the full climate impact of Punggol Campus, SIT assessed the embodied carbon of its 2 construction plots. The primary structural materials — concrete, steel and glass — accounted for approximately **204,000 tCO₂e⁴** which was **mitigated using Cross-Laminated Timber (CLT)** in one of our Super Low Energy (SLE) buildings, with an estimated **107 tCO₂e⁵ of biogenic carbon sequestered** and retained over the building’s lifetime.

In accordance with our environmental commitment, we will continue to seek opportunities to reduce our footprint – optimising how we run the campus, fostering sustainable habits in everyday SIT life, and building a community that embraces its environmental responsibility.

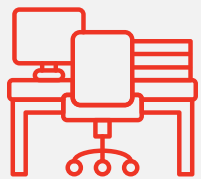


Managing resources responsibly during our campus move

CASE STUDY

Bringing the ‘old’ into the new

When the time came to fit out Punggol Campus, we had the opportunity to put circular economy principles into practice. Rather than discarding what we had, various items of furniture from tables, cabinets to equipment were assessed, catalogued, and where they were still in good condition, brought along to the new campus.



>8,000 items were **redeployed across teaching spaces, offices and laboratories**. This kept usable furniture out of the waste stream and avoided the embodied carbon of buying new.



While not everything made the move, we minimised what became waste. An additional **600** items were sold at a low price through a used furniture sale open to staff. **Other fit-for-use furniture were donated to organisations** including Willing Hearts, the Salvation Army and community groups. What could not be redeployed was recovered and disposed responsibly.

CASE STUDY

Recycle: Reducing waste through material recovery

4 out of 6 campuses had to be reinstated for handover, and we worked with our partners to reduce waste sent to landfill. **Minimal demolition** was required — only that of 1 temporary 2-storey building at Dover campus.

Dover Campus

12.7%

of furniture and water dispensers (excluding carpet) removed were recycled.

SIT@ NYP, NP, RP, SP & TP

>90% of cleared materials across these sites were reused or recycled

reducing actual waste disposal to just 7 skip bins across all 5 sites. 2 of the 5 sites, namely RP and TP campuses, did not require reinstatement works. As such, **furniture that remained in good condition** at these locations was either **moved to Punggol Campus or left for the next occupants**.



A total of

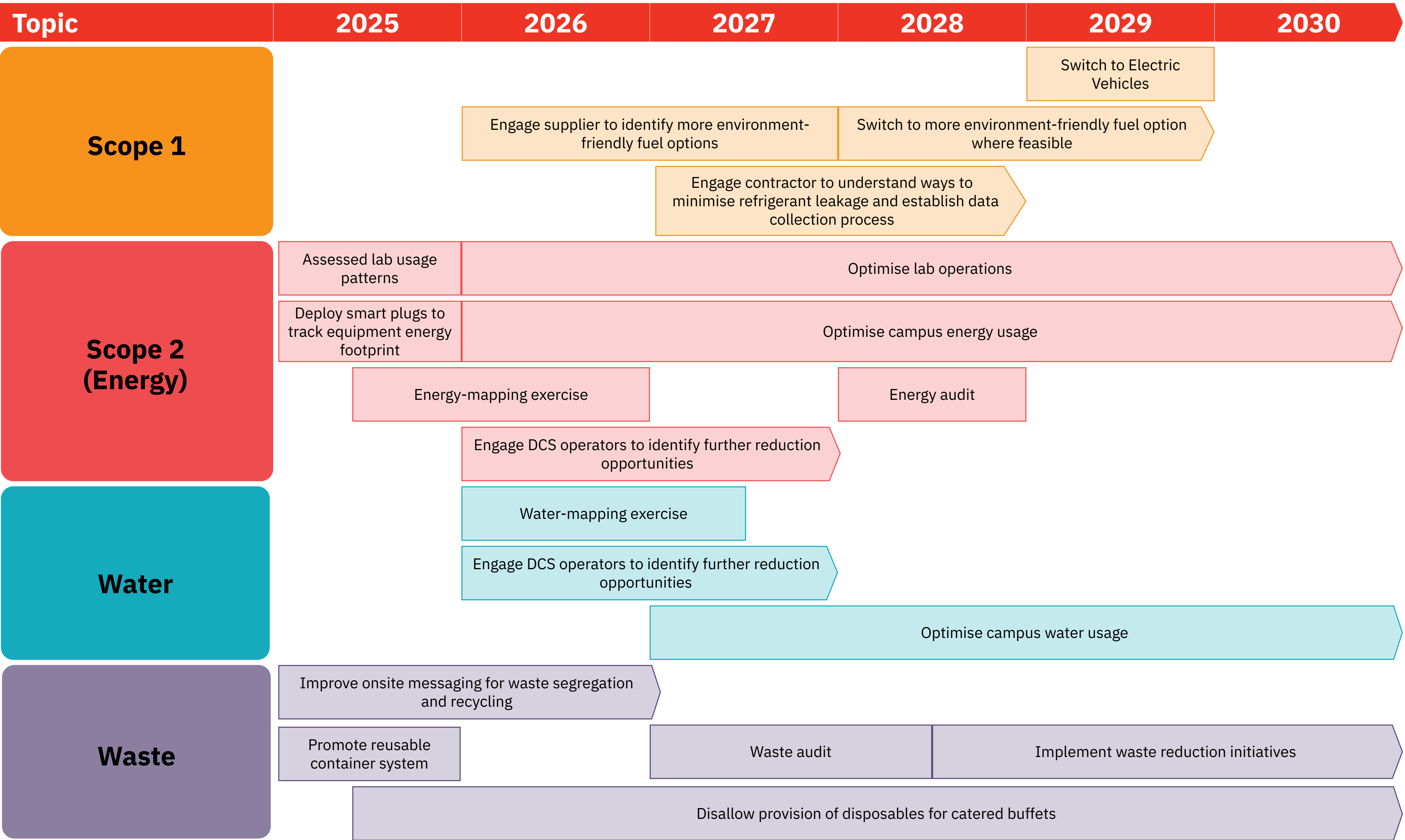
~ 2,443 kg of wood & 3,568 kg of scrap metal

were collected, reused and recycled across NYP, NP and SP campuses.

Environmental Action Plan

SIT is committed to reducing its environmental footprint and FY2025 marks a starting point. Our consumption patterns are still evolving as operations at the new campus grow to reach full capacity. Over the next 1-2 years, we will gather operational data through mapping and audit exercises while identifying opportunities to improve resource efficiency and reduce consumption.

Our commitments reflect where we are in this journey — some areas have defined actions while others are focused on building the understanding needed to set them.



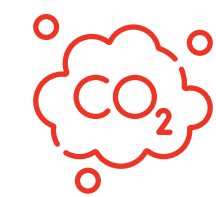
Decarbonisation and Climate Resilience

Measuring our carbon footprint

FY2025 provided the first glimpse of SIT’s carbon emissions at Punggol Campus, forming the foundation for tracking progress and directing our decarbonisation efforts as the campus grows.

FY2025 GHG Emissions

SCOPE 1



35 tCO₂e

fleet fuel from campus vehicles and town gas consumed in the FoodPlant kitchen.

SCOPE 2⁶



12,492 tCO₂e

purchased electricity for buildings and the District Cooling System, accounting for >99% of our reported emissions.

Total emissions⁷

12,527 tCO₂e

Going forward, SIT plans to expand our reporting to include Scope 3 indirect emissions. As a first step, we will work to identify the emissions categories most material to our operations, laying the groundwork for more in-depth reporting in future cycles.

⁶ Reported using the location-based method, based on the Singapore grid emission factor published by the Energy Market Authority (EMA).
⁷ FY2025 covers a partial year of operation following the move to Punggol Campus in May 2025, during which the campus was still ramping up to full capacity. This data does not yet represent steady-state consumption and is expected to evolve in the coming years.

Punggol Campus: Designed for sustainability

The move to an integrated campus unlocked decarbonisation opportunities that operating across multiple sites could not have provided.



Designed for Energy Efficiency

All buildings are certified

BCA Green Mark Platinum

With 2 meeting the Super Low Energy standard through passive displacement ventilation design and intelligent controls, achieving **40%⁸** energy savings against standard buildings.



Centralised Cooling

5,409 tCO₂e
avoided in FY2025 vs traditional chiller plant.

Utilising a centralised District Cooling System (DCS) is **55%⁹** more energy efficient than a conventional cooling system of equivalent capacity.



Generating Clean Energy

2,182 MWh¹⁰
renewable electricity generated in FY2025.

Rooftop solar photovoltaic (PV) and Building-Integrated PV, with a combined installed capacity of 1.67 MWp, supplied **>6%** of campus electricity needs in FY2025.



In FY2025

~6,286 tCO₂e
of emissions were avoided through operating the DCS and generating solar energy.

The combined impact is equivalent to ~15,600 MWh of grid electricity, or the annual electricity consumption of about

3,641 four-room HDB flats¹¹ in Singapore.

⁸ As defined by Singapore Building and Construction Authority (BCA) Super Low Energy standard
⁹ Based on a theoretical baseline as estimated by service providers.
¹⁰ Equivalent to 877 tco₂e
¹¹ Based on Energy Market Authority (EMA) average monthly household electricity consumption by planning area (4 room - 357 kwh per month)

Designed for energy efficiency

At Punggol Campus, **passive design principles** shaped every building:

- 

North-south oriented campus encourages natural ventilation
- 

Shading devices reduce solar heat gain
- 

Natural daylight is maximised to reduce the need for artificial lighting
- 

>**20,000** IoT sensors monitor environmental conditions and resource use across the campus in real-time, feeding into an **Integrated Building Management System (IBMS)** that can adjust lighting, cooling and ventilation automatically in response to occupancy and weather



CASE STUDY

A passive solution for large spaces

The Multi-Purpose Halls use **Passive Displacement Ventilation** – cool air enters at low level, and warm air rises and exits naturally without mechanical fans or motorised blowers. This system keeps a large, high-occupancy space comfortable while using **significantly less energy** than a conventional air-conditioning system would require.



Improved energy performance through centralised cooling

In Singapore’s climate, cooling accounts for a significant share of any building’s energy use. At Punggol Campus, this is addressed through a **District Cooling System (DCS)** – a centralised plant that produces chilled water through an underground pipe network, reducing the need for individual air-conditioning units in each building. Because the plant sits underground, **rooftop space is freed up for solar panels and greenery.**

In FY2025, SIT’s DCS consumed 10.8 million kWh to cool the campus – **~13.5 million kWh less** than a traditional chiller plant of equivalent capacity¹², **avoiding an estimated 5,409 tCO₂e** of GHG emissions.

CASE STUDY

Learning from the infrastructure

SIT’s partnership with ENGIE, one of the world’s leading district energy operators, goes beyond operating the cooling system. Since 2022, we have collaborated to embed the DCS into campus learning, transforming functional infrastructure into a live research and education platform.

Through the **Living Lab** initiative, **students engage directly with real-time system data and contribute to applied research on cooling optimisation.** ENGIE experts contribute to guest lectures and public masterclasses on district cooling. SIT also hosts sustainability learning journeys for the community and international guests.

The partnership is a practical expression of what Punggol Campus was designed to enable – where **infrastructure itself becomes part of the learning.**

Generating clean energy



Rooftop solar PV panels cover 10,000 m² across Punggol Campus, converting sunlight directly into electricity for campus use. In FY2025, SIT produced 2,182 MWh of renewable electricity, meeting >6% of campus electricity needs.



Building-Integrated Photovoltaics (BIPV) solar cells are integrated into the roof of our campus food court, generating power while letting natural light filter through into the space beneath.



A **PV-thermal hybrid installation** generates both electricity and thermal energy from the same solar surface – the thermal component heats water to 60°C, which is circulated into laboratory air handling units to provide low-humidity air. This reduces electricity required from the grid.

¹² The comparison is based on a theoretical baseline of 24,241 MWh for a traditional chiller plant at 0.65 kW/RT design capacity, as estimated by service providers. Actual savings may vary.

Connecting our energy systems

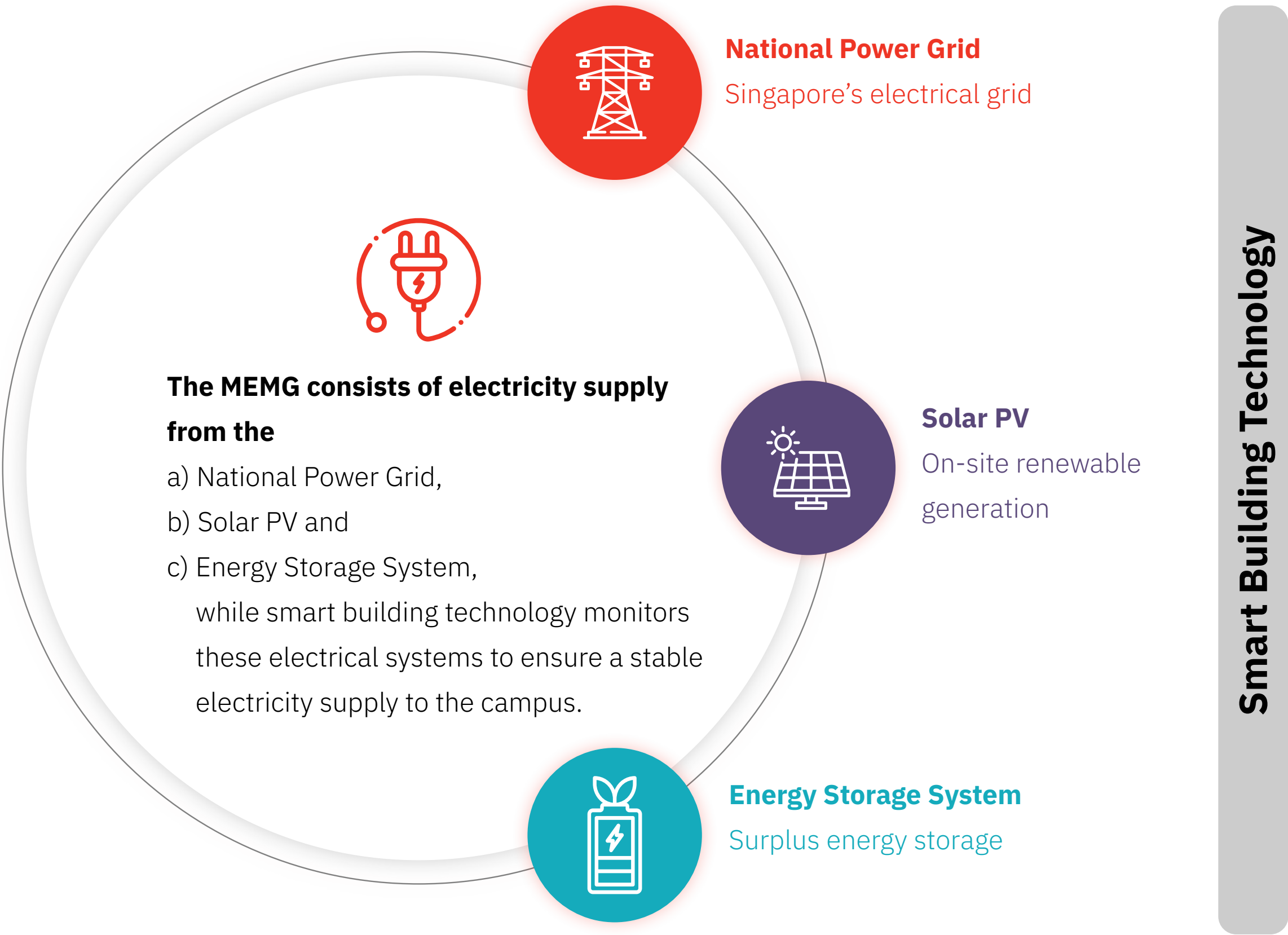
With the campus foundation in place, our focus turns to continuously improving how SIT operates. Our long-term approach to reducing operational carbon intensity is an energy system designed to grow with the campus.

Together, these **systems are not just built for today’s sustainability standards, but also designed to keep pace with future change.**



Multi-Energy Microgrid

A flexible backbone connecting SIT’s energy systems – built to incorporate new technologies and move from static efficiency to continuous optimisation.



Real-time monitoring of campus electrical grid and needs

Growing climate resilience through nature-based solutions

Mangroves are among nature’s most resilient coastal ecosystems – providing natural protection against erosion and flooding, while supporting biodiversity and storing carbon. With sea levels in Singapore projected to rise significantly by 2150, nature-based solutions like mangroves are central to long-term coastal mitigation and adaptation strategies.

To advance research, education and community engagement in mangrove conservation, **SIT is developing the Rotary-SIT Mangrove Conservatory at Punggol Campus.** Upon its completion by 2027, SIT aims to extend its mangrove restoration work to Coney Island by 2028.

Our stakeholders will engage directly with a living ecosystem, with findings intended to inform mangrove cultivation and restoration across Singapore and the region.

Mangrove Nursery

- Controlled environment to understand and grow different mangrove species
- Eventual saplings for:
 - Rehabilitation sites along coastal sites of Singapore
 - Blue carbon research



Outreach & Education

- Education on the role and importance of mangroves in environmental sustainability
- Increase understanding of mangrove restoration strategies
- Dry laboratory area for mangrove seed sorting and identification



Blue Carbon Research

- Focused studies on selected mangrove species
- Experimental system design for carbon sequestration research



SIT Photo



SIT Photo

Resource Use

With operations consolidated onto a single campus, this section sets out our energy, water and waste performance, and the work underway to improve it.

Managing energy consumption

In FY2025, SIT’s Energy Utilisation Index was 138.1 kWh/m² across Punggol Campus, reflecting our efforts in passive design, intelligent controls, renewable energy generation and having the District Cooling System.

FY2025 Energy Consumption



33,391

MWh

comprising both electricity and fuel consumption.



138.1

kWh/m²

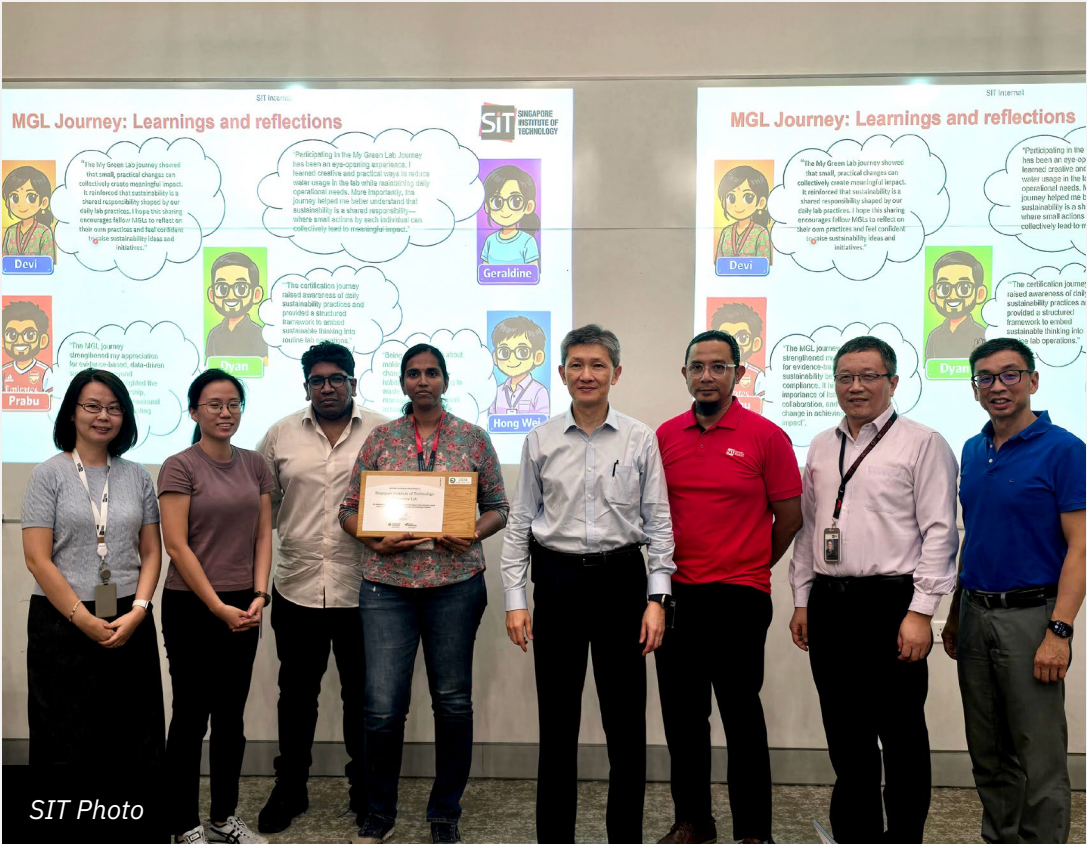
Energy Utilisation Index¹³ (EUI)

¹³ Energy Utilisation Index (EUI), the benchmarking metric used by the Singapore Building and Construction Authority (BCA) to measure building energy efficiency, is calculated by dividing a building’s total annual electricity consumption by its gross floor area. BCA’s benchmark range for autonomous universities is 92–170 kWh/m²/yr.

CASE STUDY

Greening laboratories systematically

Laboratories are among the most resource-intensive environments in a university campus, with high energy, water, chemical and waste footprints. SIT plans to reduce this systematically, embedding sustainable practices into daily laboratory operations. Actions taken to optimise resource use are already underway as we develop an action plan by 2027.



1st university

in Singapore to achieve
My Green Lab certification



4 laboratories

with **My Green Lab - Green certification** – the programme’s highest certification standard with at least 80% score on assessment

Steps taken thus far:

- 1. Formalised governance** with a green lab committee for optimised coordination and accountability
- 2. Established the Green Lab Policy** which sets clear expectations for responsible practices
- 3. Adopted recognised green lab frameworks** – My Green Labs (MGL) and Green Mark for Interiors (GMI) certifications to improve overall sustainability performance and practices
- 4. Built a network of ambassadors** across labs to support and encourage green habits
- 5. Enabled bottom-up participation** through providing feedback channels for continuous improvement and engagement

SIT Green Lab Policy

Our Commitments:



Compliance and Governance

Adhere to all relevant environmental laws, regulations and standards governing laboratory operations and waste management.



Waste Minimisation

Apply the principles of Refuse, Reduce, Reuse and Recycle before disposal to laboratory waste streams, including chemical, biological and general waste.



Monitoring and Continuous Improvement

Regularly assess the environmental footprint of laboratory infrastructure and operations, aiming for continuous improvement in sustainability performance.



Sustainable Laboratory Practices

Implement and promote eco-conscious laboratory practices, including efficient use of resources such as water, energy and consumables.



Engagement and Ownership

Empower laboratory users – staff, students and research collaborators to take an active role in maintaining sustainable laboratory environments through awareness, training and daily action.



Policy Review and Alignment

Periodically review this policy to ensure it remains relevant, effective and aligned with SIT’s evolving sustainability framework.

CASE STUDY

Advancing circular economy practices in laboratories

SIT **integrates circular economy principles into laboratory operations** through initiatives aligned with the principles of Refuse, Reduce, Reuse and Recycle before disposal. These efforts minimise resource consumption and support more efficient practices. At the same time, our laboratories continue to uphold hygiene and safety standards .

With 4 laboratories achieving My Green Lab – Green certification, we aim to scale successful initiatives across more laboratories.

Examples of initiatives include:

Reduce

- 1

**Solvent Substitution**
Replacing hazardous solvents like Chloroform with safer alternatives reduces environmental impact and health risks.
- 2

**Timers for Equipment**
Reducing idle equipment usage.
- 3

**Full-Load Autoclaving**
Maximising capacity to reduce number of cycles.
- 4

**Ultra-Low Freezer Optimisation**
Increasing temperatures from -80°C to -70°C can reduce up to 30% energy consumption while maintaining sample integrity.
- 5

**First-In, First-Out**
Ensuring a first-in, first-out inventory practice to minimise inventory waste.

Reuse

- 1

**Discharged Water**
Repurposing good quality discharged water for non-potable applications like water baths.
- 2

**Silicon Tubes for Bioreactor**
Cleaning and inspecting silicon tubes before reusing them for bioreactor runs where appropriate.
- 3

**Bottles & Pipette Tips**
Reusing clean bottles, pipette tips and other containers for non-critical laboratory applications.
- 4

**Solvents**
Recovering and repurposing up to 20L of solvents per class session during rotary evaporation for non-analytical purposes.

Recycle

- 

Proper waste segregation
Sorting waste at source according to materials such as plastic, cardboard, biohazard and general waste with clearly labelled bins. Electronic equipment which can no longer be used is sent for recycling.



Managing water consumption

Punggol Campus was designed with water management in mind. Rainwater is captured across ~40% of the campus land area through bioswales, rain gardens and green roofs. The system can **save up to an estimated ~85,000 m³** of water annually.

In 2022, this approach earned SIT the **Active Beautiful Clean Waters Certified (Gold) Award**, by PUB - The National Water Agency.

FY2025 Water Consumption



195,684
m³



14.8
m³/person/year
Water Efficiency Index (WEI)



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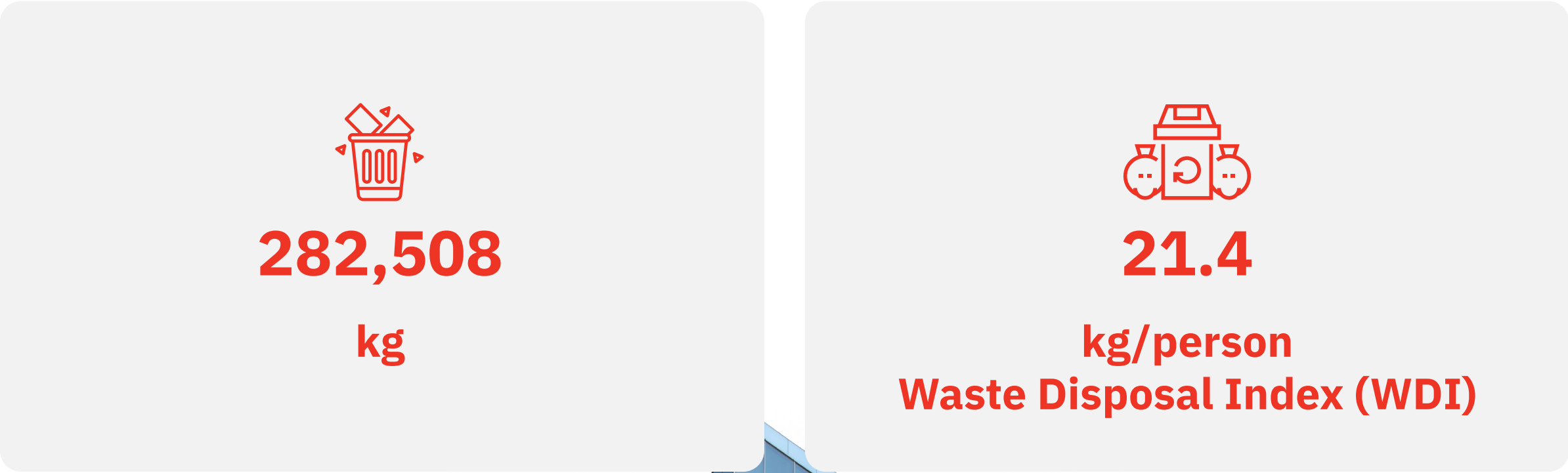


SIT Photo: Gareth Phua

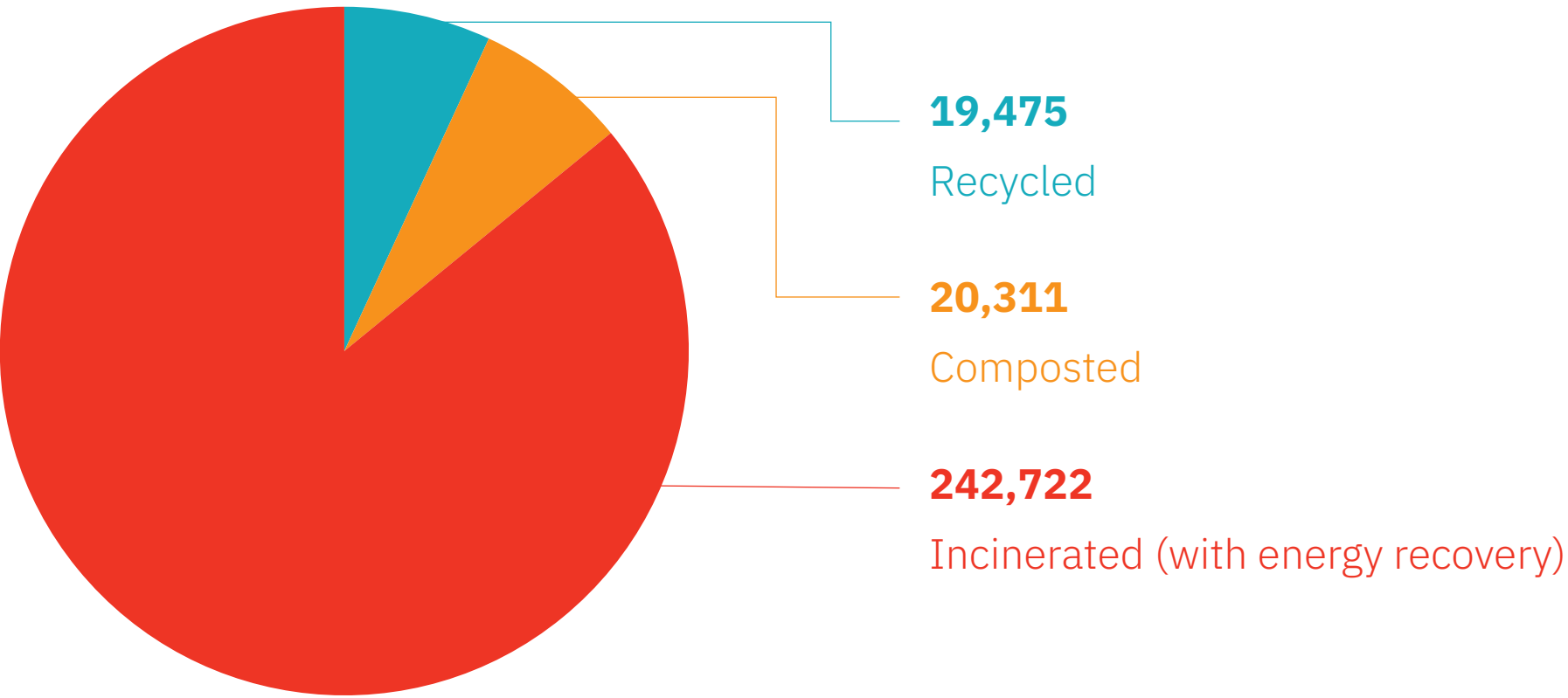
Managing waste generation

We have begun tracking how our waste is generated and disposed of, providing an initial view of our waste streams. Building on this, we plan to conduct a waste audit in 2027 to better understand them and implement targeted reduction measures.

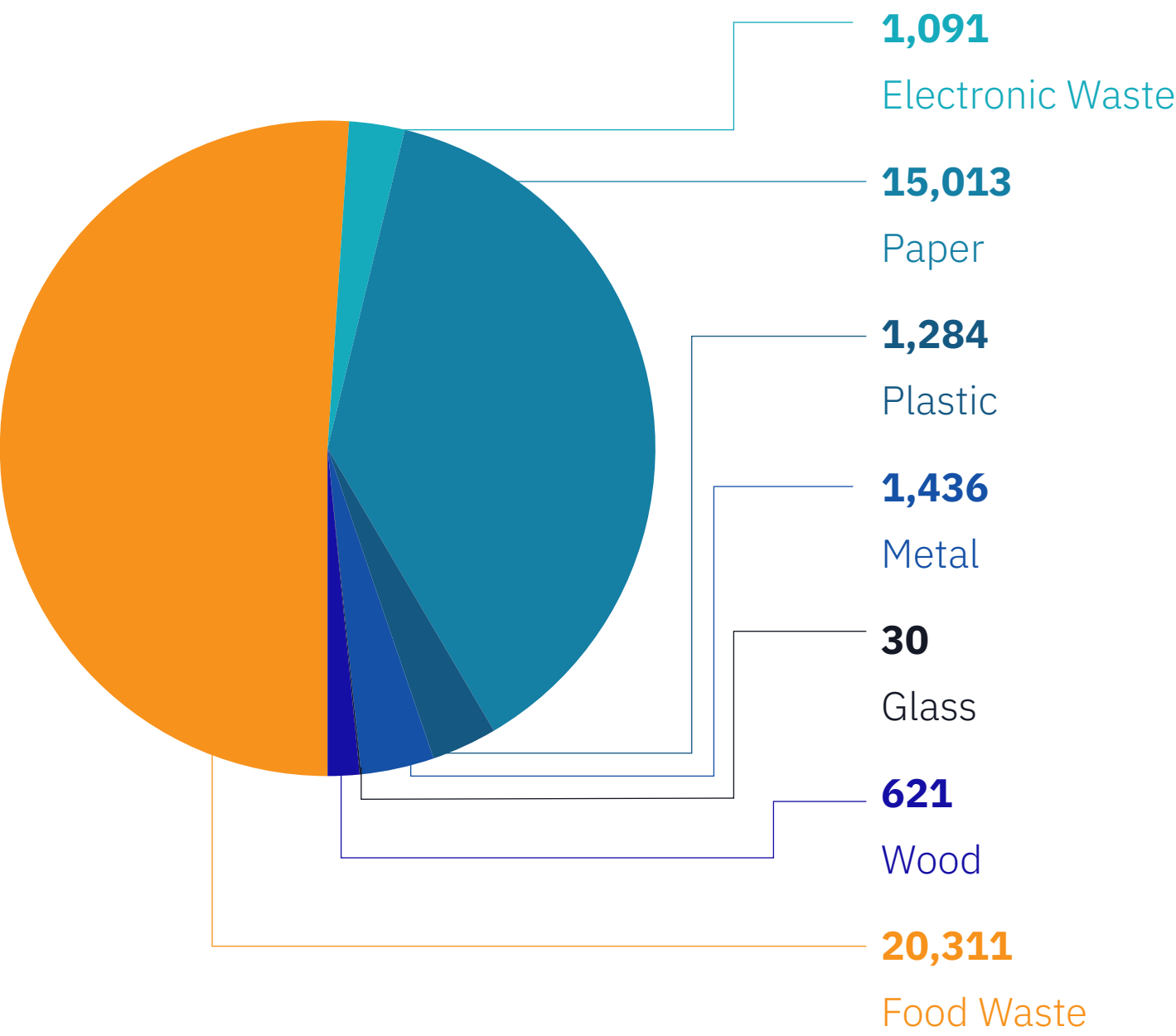
FY2025 Waste Generation



Waste by Disposal Method (kg)



Recycled and Composted Waste by Material (kg)

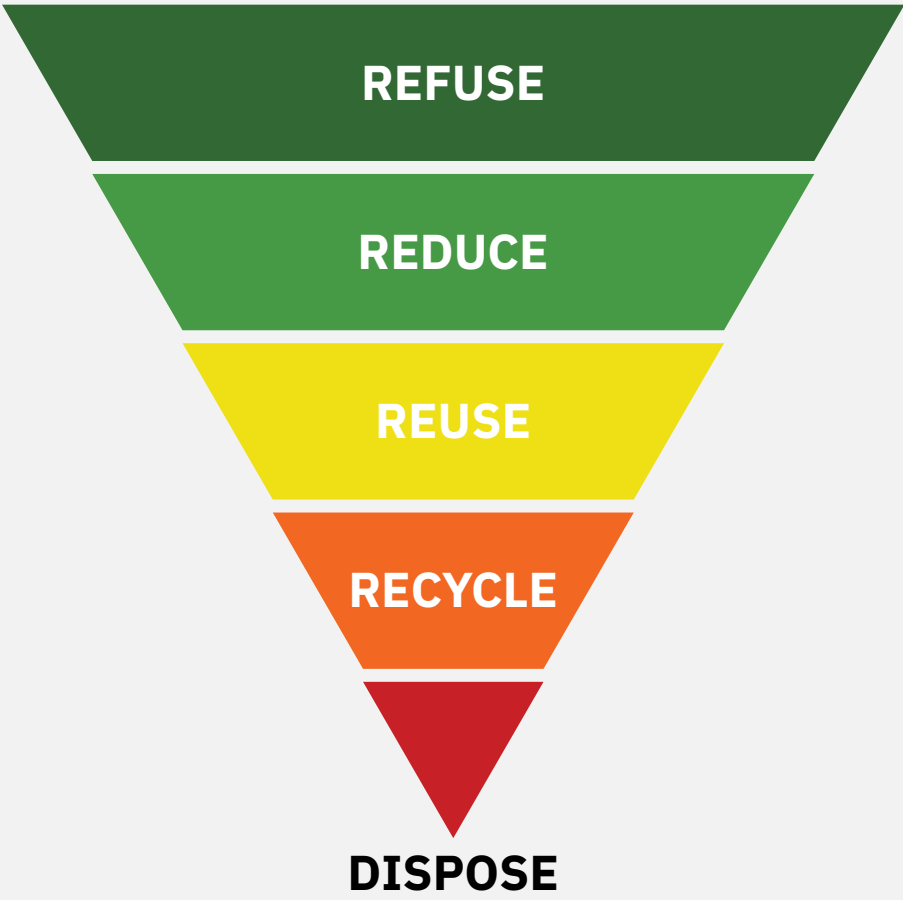


CASE STUDY

Prioritising Refuse and Reduce

Most waste is directed to waste-to-energy incineration through Singapore’s national waste management infrastructure. Food waste is treated via digestors on-campus and almost half of it is used for landscaping in the campus, while dry recyclables are collected for recycling.

Even as we build our waste tracking capabilities, reduction is already underway. Early efforts have focused on tangible, high-impact changes — including **phasing out single-use disposables from catering**. As our data matures, we will be better placed to understand our waste streams and target reduction where it matters most.



CASE STUDY

Rethinking catering waste

The University hosts hundreds of events a year, – and the disposable tableware that comes with them adds up. In FY2025, 825 catered events on campus used >58,000 sets of crockery and cutlery in total.

Recognising this, SIT introduced a policy, effective August 2025, requiring that catered buffets not use disposable tableware. As a result, **42% of events used reusable or bring-your-own (BYO) crockery and cutlery in FY2025**.

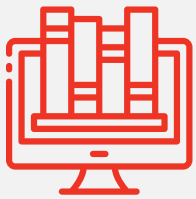
This resulted in avoiding >23,000 sets of single-use cutlery, equivalent to **>900kg of single-use plastic¹⁴**.



SIT Photo

CASE STUDY

Redefining library spaces – Going digital with academic resources



99% of SIT’s library collection is digital

SIT Library adopts an e-preferred approach, **prioritising digital resources that are accessible anytime, anywhere**. Licensed e-materials are updated in a timely manner and can be accessed by multiple users simultaneously, meeting the needs of students and staff while reducing resource use associated with physical processing, shelving and disposal. This frees up space for students to collaborate and study.

CASE STUDY

Refurbishing and recycling e-waste



In FY2025

60 laptops were refurbished and donated to students.



754 laptops & desktops were channeled for reuse and recycling.

We ensure valuable e-waste such as laptops, desktops and docking stations are recycled, after they are determined to be no longer suitable for use.

¹⁴ Estimated based on 23,083 reusables and BYO settings at an assumed weight of 40g per single-use plastic set.