Decarbonisation
Playbook for IHLs
OVERVIEW OF THE DECARBONISATION PLAYBOOK FOR IHLS

The Decarbonisation Playbook for Institutes of Higher Learning (IHLS) is jointly developed by KPMG in Singapore and the Singapore Polytechnic (SP). This playbook is an outcome of ongoing collaboration between KPMG and SP to create a comprehensive net-zero strategy, aimed at decarbonising the SP campus.

The playbook underscores the significance and various considerations needed to attain net-zero emissions. By acknowledging and adopting this important objective, it sets the stage for IHLS to refine their strategies towards global climate goals as well as enhance their resilience.

This playbook will explore the challenges, levers, enablers and SP as a case study on the decarbonisation of IHLS.

How this resource can be used:

**As a reference guide:**
For IHLS looking for information on campus decarbonisation.

**As a roadmap:**
As a guide for IHLS that are already on the path to decarbonisation.

**As a training tool:**
The playbook can help employees in understanding the importance of decarbonisation and how they can contribute to the IHLS’ decarbonisation efforts.

1. Use case - SP net-zero strategy and roadmap project in collaboration with KPMG outlining the project approach as a guide for other IHLS’ to start their net-zero journey.

4. Categories of decarbonisation levers: Reduce, Replace, Produce and Procure, enabling IHLS to envision what measures and solutions they can consider for their decarbonisation implementation.

5. Decarbonisation enablers: sustainable financing, change management, digitalisation, decentralisation, and governance and reporting.
CLIMATE CHANGE AND DECARBONISATION
Singapore sits at 1.5 degrees north of the Equator, making the country more vulnerable to the impacts of climate change. Some of these impacts have already resulted in extreme weather events around the world, rising sea levels, and a greater loss of biodiversity.

Warmer days and nights
More warm days and warm nights for February to September throughout the 21st century.

Sea levels are projected to rise by up to about one metre.

Daily mean temperatures are projected to increase by 1.4°C to 4.6°C.

Increase wind speed
Potential increase in wind speed during the northeast monsoon season.

Heavier rainfall
Intensity and frequency of heavy rainfall events are expected to increase as the world gets warmer.

Source: National Climate Change Secretariat, Prime Minister Office
CLIMATE CHANGE LEADING TO A COMMITMENT TO NET ZERO BY 2050

- Achieve Net-Zero emission by 2050
- Long-Term low-Emissions Development Strategy (LEDS)
- Reduce 2030 emission to 60 MtCO₂e
  2030 Nationally Determined Contribution (NDC)

- Catalyse business transformation
- Pursue effective international cooperation
- Invest in low-carbon technologies
- Adopt low-carbon practices
70% of global greenhouse emissions come from the use of infrastructure - the infrastructure we build today will determine our success in achieving net zero.

‘Infrastructure can be the pillar upon which we base our growth, development and climate action, or it can crumble beneath us. If we want a prosperous, climate-resilient future, we must invest in sustainable infrastructure; it is the growth story of the future’ (World Bank)

ACCELERATING DECARBONISATION AGENDA

Regulatory Landscape
Singapore’s commitment to net-zero by 2050
Public sector’s commitment to net-zero by 2045

Stakeholder and reputational pressures
Actions demanded by organisational boards, students and the public

International push for greater sustainability
Global efforts to combat climate change (e.g. Paris Agreement)

Business Continuity
Climate risks affecting business as usual due to changing operating conditions and landscape
SINGAPORE INITIATIVES AND TARGETS

Green Building Masterplan 2021
- 80% of green buildings by 2030
- 80% of new buildings to be Super Low Energy (SLE)
- 80% improvement in energy efficiency

Zero Waste Masterplan 2019
- 30% reduction of waste-to-landfill by 2030

Net Zero 2050
- Peak emission by 2025
- 10% reduction of energy and water by 2030.
- 30% reduction of waste by 2030.
- Sustainability in procurement and policies.
- Green Mark SLE buildings

GreenGov 2045
- Campus as Living Labs
- 66% reduction of net carbon emission from schools by 2030
- 20% of schools to be carbon neutral by 2030

MOE Targets & Plans
- Statutory Boards to provide Sustainability Report from FY2024 onwards
- Clean energy vehicles from 2023

Others (e.g. MSE)
**NET-ZERO OVERVIEW**

“Net-zero emissions are achieved when anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period.” ——— Intergovernmental Panel on Climate Change (IPCC)

As a starting point, IHLs need to define the boundary and establish the carbon emission baseline. It is encouraged to start from Scope 1 and 2 emissions. Greenhouse Gas (GHG) protocol provides guidance on boundary setting and carbon accounting.

The Science Based Targets Initiative (SBTI) Corporate Net-Zero Standard provides guidance, criteria and recommends setting net-zero targets aligned with climate science. To achieve net-zero emissions, IHLs need to address and reduce emissions across the value chain (Scope 1, 2 and 3).

**What are Scope 1, 2 and 3 carbon emissions?**

- **Scope 1** Direct emissions that are owned or controlled by a company
- **Scope 2** Indirect emissions that are a consequence of a company’s activities but are from sources not owned or controlled by the company
- **Scope 3** Indirect emissions that are upstream and downstream activities

**Achieving net-zero emissions through sustainable operations**

With the effects of climate change posing a risk to physical infrastructure, supply chains, and operations, investing in resilient and sustainable infrastructure can help universities adapt to changing climate conditions.

For example, taking proactive steps to reduce energy consumption as well as implementing energy-efficient measures can lead to cost savings in the long run.

IHLs achieving net-zero can serve as a role model, showcasing innovative solutions for decarbonisation, sustainable energy, and waste reduction.

IHLs can incorporate their journey to net-zero into their curriculum, offering students the chance to learn about sustainability, climate policy, and environmental sciences. This hands-on learning experience can better prepare students for a world that values sustainability.
DECARBONISATION CHALLENGES FACED BY IHLs

OVERVIEW

Complex Systems
Some IHLs have buildings that have different purposes and operation profiles.

Old Facilities
Outdated infrastructure which are not energy efficient. Retrofitting can be costly and complex.

Immaturity of Data Collection
Lack the necessary data management systems and tools.

Balancing Priorities
IHLs have multiple priorities, including research, education, and student experience. Balancing these priorities with decarbonisation efforts can be challenging.

Financial Constraints
Perceived high capital investments needed for decarbonisation solutions

Lack of Incentives
Lack of incentives to adopt decarbonisation solutions

Lack of Technical Expertise
Lack of knowledge of suitable tools and solutions

Behaviour Change
Changing behaviour and attitudes towards energy consumption and waste reduction. This cultural shift can be difficult to achieve and will take time.

Resistance to Change
(Refer to next page)
Resistance to change is a common challenge faced by organisations, including institutes of higher learning, when attempting to implement significant transformations like decarbonisation.

Status Quo Bias
People are often comfortable with familiarity and may resist changes that disrupt their routines or established ways of doing things.

Fear of the Unknown
Decarbonisation involves adopting new technologies and approaches. People might resist these changes due to uncertainty about how these operational changes will affect them.

Loss of Disruptions
Changing energy systems or building designs might lead to temporary inconveniences, such as fluctuations in temperature or power availability. This can lead to resistance from stakeholders.

Lack of Awareness
Some stakeholders might not fully understand the urgency or importance of decarbonisation, leading to indifference or resistance.

Perceived Costs
Individuals might focus on the short-term costs of decarbonisation efforts without considering the potential long-term benefits.

Organisational Culture
If an institution’s culture does not prioritise sustainability or innovation, it may face more resistance to change.

Lack of Leadership Support
If key decision-makers within the institution are not fully on board with decarbonisation, it can impede progress.
OVERCOMING DECARBONISATION CHALLENGES FOR IHLS

Communication and Education
Clearly communicate the rationale, benefits, and importance of decarbonisation to all stakeholders to build awareness and support.

Engagement and Involvement
Involve relevant stakeholders in the decision-making process and consider their inputs when designing and implementing decarbonisation strategies.

Showcase Success Stories
Highlight examples of successful decarbonisation initiatives to inspire and motivate others.

Leadership Buy-In
Secure support from top leadership to demonstrate commitment and set an example for others.

Provide Training
Offer training programs to equip staff and faculty with the necessary skills and knowledge to support decarbonisation efforts.

Incentives and Rewards
Offer incentives for individuals and departments that actively participate in decarbonisation efforts.

Data-Driven Approach
Use data to demonstrate the impact of decarbonisation efforts and to make informed decisions.

Gradual Implementation
Introduce changes incrementally to help people adjust and adapt better to the changes.
SP’S JOURNEY TOWARDS NET-ZERO
Prior to 2023, SP was already well-known as a champion for sustainability. The polytechnic was awarded the 2010 President’s Award for the Environment, the highest accolade in Singapore for the field of environmental sustainability.

To support Singapore’s Green Plan 2030 and net-zero goal of 2045, culture change within SP is key. The following steps were taken to drive culture change:

In January 2023, the directors of all constituent schools and departments in SP, together with PCEO, attended training in Sustainability Reporting/Climate Strategies, Carbon Management & Accounting.

In April 2023, at the annual workplan seminar attended by all SP staff, climate change, sustainability and decarbonisation topics were introduced.

From May to June 2023, the directors of all constituent schools and departments engaged their respective staff to collectively identify behavioural changes towards more sustainable lifestyles. By July 2023, 85% of all SP staff voluntarily pledged their commitment to these changes.

From July to September 2023, PCEO engaged 875 ground-level staff in small groups of about 50 on Singapore’s sustainability challenges and SP’s response.

On 5 July 2023, in support of the government’s Go Green SG Month, PCEO, backed by the directors of all constituent schools and departments, pledged SP to be a Champion for Sustainability under the Ministry of Sustainability and the Environment (MSE) Green Nation Pledge exercise. The Minister of State for Sustainability and the Environment was in attendance, and about 1100 staff and students participated in the Go Green SP Forum. The goal of getting SP to reach net-zero emissions ahead of the Government’s schedule of 2045 was also announced.
SP’S ROLES IN SINGAPORE’S DECARBONISATION CHALLENGE

SP must play its role to reduce carbon emissions to help Singapore attain her its net-zero target. As an IHL, SP should aim to do so ahead of the Government’s timeline of 2045.

List of areas SP should address, beyond just campus net-zero goals:

**PET Curriculum**
As an IHL, SP has a critical role in equipping students with the values and job skills for a future driven by the sustainability. It must update its curriculum continually towards this end. Thus, in 2023, all SP students undergo a Common Core Curriculum where it is compulsory to undertake a sustainability innovation project. Students can take their interest further through the Minor in Sustainability programme.

**Student Behavioural Change**
Beyond curriculum, SP also must mobilise students to adopt more sustainable lifestyles and imbue a sustainability mindset among the students. Within the array of student co-curricular activities, SP has an Environment Club. This dedicated group played a pivotal role in supporting the Go Green SP Forum on 5 July 2023. The event was aligned with the nationwide Go Green SG initiative. Additionally, SP has students committed towards NParks’ Green Rangers programme, dedicated to supporting tree planting in the community.

**Staff Behavioural Change**
SP staff must also ‘walk the talk’ and mobilised to change their behaviour towards more sustainable lifestyles. There was extensive engagement with staff for culture change to take place.

**Industry Outreach**
In its role to help industries transform and stay competitive, SP must infuse sustainability in its various domains and disciplines. In particular, SP can leverage its 38 hectares of campus as a living lab to showcase sustainability technologies and strategies for Singapore firms and also within the region. SP’s Centre for Environmental Sustainability and Energy Efficiency (ESEE) will support and streamline the green transition journey for large companies and SMEs by offering a comprehensive suite of carbon emissions and carbon management consultancy services and solutions to industry partners.

**CET Curriculum**
SP also has the role in equipping the adult workforce for the changes anticipated as Singapore and the world pivot towards sustainability. It must continually update its curriculum for this role.

For further information, kindly visit SP Sustainability webpage:
Sustainability Matters (sp.edu.sg)
In June 2023, KPMG was appointed as consultants for SP’s net-zero strategies and roadmap after a tender exercise. In scoping the study, it was recognised that a comprehensive 4-phase approach was needed. The report is due in Q1 2024.

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<tr>
<th>Baseline Establishment</th>
<th>Opportunities Identification &amp; Target Setting</th>
<th>Detailed Assessment and Roadmap Development</th>
<th>Sustainability Reporting</th>
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<td>• Carbon accounting and data gathering to understand the “shape” of the carbon profile including Scope 1, 2 and 3 emissions</td>
<td>• Conduct market scans and audits targeting water, waste and energy efficiency to identify sustainability opportunities</td>
<td>• Conduct a detailed techno-economic assessment of the prioritised decarbonisation opportunities</td>
<td>• Develop a carbon impact template for capital projects that measure the potential impact on Scope 1, 2 and 3 emissions</td>
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<td>• Understand expected business changes, and current and planned sourcing strategies, on-site generation, and energy efficiency efforts</td>
<td>• Conduct a preliminary assessment of the identified decarbonisation opportunities</td>
<td>• Develop a detailed and actionable roadmap for decarbonisation, including identifying and sequencing projects to achieve specified decarbonisation targets</td>
<td>• Conduct materiality assessment, and peer benchmarking to develop sustainability framework for reporting with reference to GRI2021 standards</td>
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Beyond the initial consultancy study, there will be a process of continual improvement as SP strives towards its net-zero targets.

**SP’s Net-Zero Approach**

- **Baseline Establishment**
  Define boundary and develop Scope 1-3 baseline

- **Opportunities Identification & Target Setting**
  Define decarbonisation opportunities and establish feasible Scope 1-3 targets

- **Detailed Assessment and Roadmap Development**
  Conduct techno-economic assessment of the prioritised opportunities and develop decarbonisation roadmap

- **Sustainability Reporting**
  Develop carbon impact template and publish the inaugural sustainability report with reference to GRI standards

- **Implementation & Performance Monitoring**
  Re-establishment of baseline
  
  **Implementation**

  **Continuous Improvement**

  **Performance Assurance**
INTERIM GOALS

Ahead of the completion of the consultancy report, SP anticipates that it must take aggressive steps over the next few years to realise its net-zero targets. In particular, major infrastructural investments must be made, which will take a few years before lower emissions can be reaped. However, pending the realisation of these emission gains, SP will endeavour to lower its energy consumption through changes in staff and student behaviour and operational processes by another 5% from the baseline. (As a government entity, SP is required to reduce its energy consumption by 10% by 2030, using the average consumption for the period 2018 to 2020 as baseline. SP has already reached this target in 2022.)
SP regards climate change as an existential challenge for Singapore and the world. Thus, we pursue collaboration, knowledge sharing and benchmarking of best practices with all entities in all areas relevant to sustainability. This Playbook, a collaboration between KPMG in Singapore and SP, is one such example. Going further, SP has partnered with the ProjectZero Office of the City of Sonderborg, Denmark in the ProjectZero Network.

The ProjectZero Network seeks:

- To share best concepts, practices, knowledge, technologies, including those implemented by ProjectZero A/Z Sonderborg, to advance sustainability, decarbonisation and net-zero emissions agenda; and

- To grow an international network of partners for collaboration towards the agenda
SP’S ECOSYSTEM & PARTNERSHIPS
NET-ZERO FRAMEWORK

Decarbonisation Levers

Reduce
energy consumption with energy-efficient solutions

Replace
existing energy sources with low or zero-carbon alternatives

Produce
on-site generation of green/renewable energy

Procure
green energy, green supply and carbon offsets

Decarbonisation Enablers

Change Management
Sustainable Financing
Decentralisation
Digitalisation
Governance & Risks
DECARBONISATION LEVERS

IHLs are investing in resources, innovation, and infrastructure to accelerate the shift to a low-emissions future. Proactive planning and timely action are crucial in reducing the costs involved in industrial decarbonisation and ensuring a smooth transition.
Each IHL has unique characteristics which necessitate a blend of financial, digital, communication, and change management measures as they chart their decarbonisation pathway.

**Change Management**
Decarbonisation is not only about adopting technologies. Behaviour matters and affects the decarbonisation progress. IHLs could focus on adopting a change management approach centred around people to cultivate a collective vision for the Net-Zero transition, communicate and engage stakeholders in both top-down and bottom-up approaches, facilitate change, and embrace a fresh sustainable mindset.

**Sustainable Financing**
Sustainable financing can provide IHLs with the means to make meaningful investments in decarbonisation efforts, and advance environmental sustainability. By aligning financial resources with sustainability goals, IHLs can drive positive change in their campuses.

**Decentralisation**
Smart grids are pivotal in enhancing the efficiency of electricity transmission and distribution networks, facilitating the smooth incorporation of renewable energy sources and distributed resources. Decentralisation aids the decarbonisation efforts by through integrating with clean energy generation onsite.

**Digitalisation**
Data granularity is the foundation of any decarbonisation plan. A campus-level, scalable and open architecture digitalisation strategy will help IHLs to optimise, automate and continuously improve infrastructure management. The strategy should take into consideration metering/sensors for electricity, gas, water, waste, sound, lux, IAQ, occupancy, movement, and so on. IHLs should also be encouraged to explore IoT devices and 5G opportunities to make the most of enterprise digitalisation.

**Governance & Risks**
Governance and internal sustainability policies help to embed sustainability into the organisational culture, which facilitates the achievement of decarbonisation targets. Understanding the risks imposed by climate change, including both physical and transition risks, will also help IHLs to accelerate their decarbonisation journey and commit to decarbonisation targets that are both ambitious and feasible.
PLAN AND IMPLEMENT DECARBONISATION ROADMAP

IHLs should focus on building a resilient future by crafting a strategic decarbonisation roadmap to achieve ambitious sustainability targets and drive organisational success.

**Strategise & Plan**
- Establish baseline and identify goals
- Formulate a plan to measure, and monitor data across the value chain

**Execute**
- Conduct project kick-off meetings with key stakeholders
- Initiate and manage timeline and deliverables, and track progress of ongoing project management activities
- Understand stakeholders’ involvement in meeting ESG reporting requirements
- Communicate changes to stakeholders

**Report & Optimise**
- Create a process to document, identify, categorise, and track risks
- Assess decisions for potential impacts and escalate to the appropriate stakeholders
- Document and manage requests for changes
- Provide data model-based analysis for better informed decision making

**Governance**
- Establish governance framework with management oversight and clear accountability structures
- Institutionalise adaptability in reporting mechanisms with regular reviews of critical assumptions

The playbook serves as a guide for IHLs embarking on their decarbonisation journey, providing insights, strategies, and actionable steps for a net-zero future.