HKUST NET-ZERO ACTION PLAN 2045:
2024/25 PROGRESS UPDATE

First Year Update

HKUST's Net-Zero Action Plan acts as a comprehensive roadmap that outlines five strategic areas for action to steer use toward our 2045 net-zero target. In addition to making progress towards our goal, we are also committed to providing regular updates, sharing our experiences and knowledge gained, and recognizing communal efforts.

The Action Plan was endorsed in February 2024, and through University-wide efforts, has made progress in each action area over the past year. Several key achievements include: development of our Net-Zero Building Standards that have already been adopted in the design and construction of Research Building 3; using an Internal Carbon Price in decision-making for green building materials; and committing HK$30 million towards investing in advancing sustainability and net-zero technologies on campus through our Living Lab program.

Key Achievements and Upcoming Activities

01 All New Buildings Must Be Designed and Operated as Net-Zero Carbon Buildings

Past Year Achievements

Policies & Tools Development

- **Published Net-Zero Building Standards:** Adopted in new Research Building 3 and includes: new solar panel installation target to maximize renewable energy capacity in excess of BEAM Plus standards; new embodied carbon standard of 500 kg CO_2/m^2 or less.
- **Applied Internal Carbon Price:** Developed tools to factor shadow carbon cost into decision making for technology and building materials (e.g. green rebar, green concrete, building-integrated photovoltaics).

On-Campus Project Implementation

- **Adopting Green Building Materials:** Martin Ka Shing Lee Innovation Building will be one of Hong Kong's lowest embodied carbon buildings at less than 500 kg CO_2-e/m^2. By adopting green rebar and concrete, the building's embodied carbon is 30% less than the Hong Kong Green Building Council's absolute baseline for non-residential buildings.
- **Applied Embodied Carbon Standard in New Construction:** Research Building 2 and High Performance Computing 5 building embodied carbon standard of 500 kg CO_2/m^2 or less.
- **Optimized Renewable Energy Generation:** Research Building 2 and High Performance Computing 5 building maximized roof and façade solar panel installation capacity.

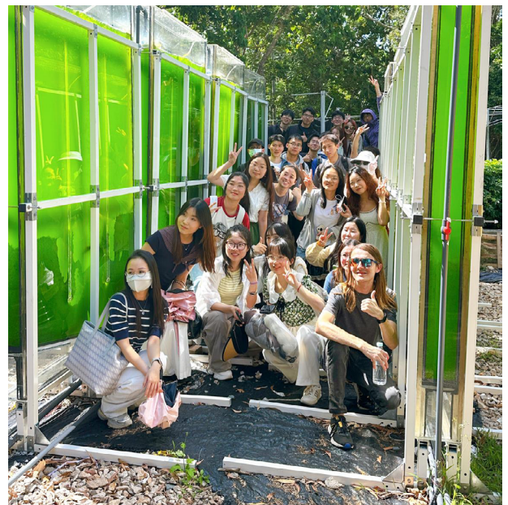
Upcoming Activities (3 Years)

Gain Implementation Experience & Industry Knowledge

- **Build Net-Zero Carbon Building Database:** Develop embodied carbon, operational carbon and life cycle cost database from environmental performance disclosure data of our building projects.
- **Trial Shadow Carbon Cost Application:** Build experience in implementing shadow carbon cost.
- **Maximize Building-Integrated Photovoltaics:** Evaluate every upcoming building design for opportunities to incorporate building-integrated photovoltaics to reduce reliance on the grid.
- **Collect Granular Energy Data:** New buildings to have submetering to facilitate carbon cost recovery and research in energy efficiency and management.

Drive New Initiatives

- **Pilot Radiant-Cooling Systems:** New Research Building 2 as the first campus radiant-cooling system.
- **Pilot Direct-Current Power:** Pilot direct current power in the new High Performance Computing 5 building.
- **Evaluate Carbon Removal Systems:** Seek opportunities to pilot carbon removal systems using campus infrastructure.



Key Achievements and Upcoming Activities

02 Invest Aggressively in Energy Conservation, Renewables, and Decarbonization

Past Year Achievements

Policies & Tools Development

- **Allocated HK$30M Funding for Decarbonization Research and Innovation:** Funding for next eight years towards the Sustainable Smart Campus as a Living Lab program; funded by Feed-in-Tariff scheme.
- **Published Building Renewal Standards:** Renovation projects will upgrade to latest equipment and controls for energy efficiency and disclose environmental building performance.

Strategic Partnership & Engagement

- **Collaboration to Drive Decarbonization Technology:** Corporate partner to Carbonless's Hong Kong Green Tech Challenge to identify and assess over 20 technologies suitable for early adoption on campus.

On-Campus Project Implementation

- **Developed Campus Renewal Plan (CRP):** Obtained senior management approval for phasing and budget, includes decarbonization projections.
- **Expanded Renewable Energy Deployment:**
  - Shaw Auditorium: Maximized PV installation, bringing total campus capacity on campus to 2.47 MW.
  - Solar PV Phase II assessment: evaluated over 25 non-traditional sites for additional solar PV installation;
  - Feasibility Assessments: Completed 1 MW offshore floating solar system technical and regulatory feasibility assessment.
  - Next Generation Data Center Efficient Cooling: Launched the city's largest Liquid Immersion Cooling system in our newest research computing facility.
  - Electrification of Car Fleet: Targeting electrification of over 30% of the University's fleet; the remainder are low-emission hybrid vehicles.

Upcoming Activities (3 Years)

Gain Implementation Experience & Industry Knowledge

- **Transport Electrification** HK$40M investment in infrastructure to support electric vehicles charging facilities.

Drive New Initiatives

- **Evaluate Solar in Existing Buildings:** Initiate site assessments to pursue first implementation of building-integrated photovoltaics (BIPV) for existing campus building.
- **Assess Solar for Non-Roof applications:** Evaluate opportunities for pilot of innovative solar photovoltaics applications on campus (e.g. floor pavers, solar windows, etc).
- **Assess Non-Fixed Solar Applications:** Evaluate opportunities to pilot non-fixed solar photovoltaic systems on campus facilities / campus shoreline.
- **Evaluate Microgrid Systems:** Evaluate feasibility for small scale campus microgrid system.
- **Evaluate Bus Shuttle Electrification:** Initiate and facilitate electrification of campus shuttle fleet operations with operators.

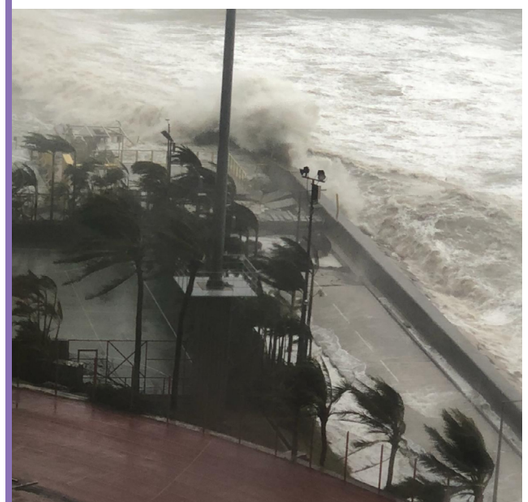
Key Achievements and Upcoming Activities

03 Implement Measures that Allow Us to Adapt and Become Resilient to Climate and Weather Changes

Past Year Achievements

Policies & Tools Development

- **Strengthened Business Continuity Measures:**
  Adopted flexible work policy and staff mobile computing guidelines.
- **Published Resilient Building Standards:**
  New design requirements that address climate change adaptation through studies for temperature, rainfall, water level rise / storm surge, forest fire, and typhoons.



Strategic Partnerships & Engagement

- **Resilience Research:**
  Collaboration with China Meteorological Administration to enhance early warning systems, strengthen disaster preparedness, and build climate-resilient communities.
- **Climate Change Monitoring:**
  Commissioned by the Technology and Engineering Center for Space Utilization of the Chinese Academy of Sciences (CSU.CAS) to lead the development of the world's first lightweight, high-resolution high-precision carbon dioxide and methane synergistic observatory payload.

On-Campus Project Implementation

- **Developed Resilient Cooling Infrastructure:**
  Commenced future-proofing of air-conditioning provisions to mitigate rising seawater temperatures.

Upcoming Activities (3 Years)

Gain Implementation Experience & Industry Knowledge

- **Review Working In Extreme Heat Measures:**
  Initiate review process for working in extreme heat guidelines for staff and contractors.
- **Review Business Continuity Plan:**
  Initiate campus review process for extreme weather incident business continuity plans.

Drive New Initiatives

- **Resilience Risk Assessment:**
  Engage faculty and industry to assess resilience risk for HKUST campus to develop design and policy recommendations.
- **Tree Resilience Study:**
  Commence a campus tree study to assess impact on heat and flood mitigation.

Key Achievements and Upcoming Activities

04 Create Viable Pathways to Net-Zero Research and Skill-Building

Past Year Achievements

Net-Zero Training & Equipping Industry

Staff & Students

- Provided the "Sustainable Design Thinking Certificate" program for students from HKUST Clear Water Bay and HKUST Guangzhou.
- Completed 2022/23 and 2023/24 annual sustainability course evaluation.
- Developed and published four training modules to teach Life Cycle thinking for sustainability.

Contractors & Suppliers

- Developed and published six training modules and two interactive tools for building contractors and consultants to support Net-Zero Building Standards.

Industry

- Partnership with Hong Kong Science and Technology Park's "Future Ecopreneur Bootcamp" to provide greentech startup skills development and mentoring.

On-Campus Project Implementation

- **Piloted Decarbonization Projects:** Funded on-campus decarbonization research projects, including (1) algae-based carbon capture solution, and (2) building-integrated photovoltaics for existing staff quarters building.

Strategic Partnership & Engagement

- **Initiated Carbon Neutrality Collaboration:** Led the establishment of the "Joint Declaration on Embracing a Living Lab Approach to Promote Carbon Neutrality" with 16 other leading universities.
- **Formed Industry Collaboration In Advanced Materials And Zero-Carbon Technologies:** CATL & HKUST memorandum of understanding to advance innovation and talent grooming in sustainable development and new energy technology.
- **Supported Local Decarbonization Startups:** Provided research and development and pilot site support to carbon capture, electricity-free cooling, and food waste management startups from Hong Kong Science & Technology Park.

Upcoming Activities (3 Years)

Gain Implementation Experience & Industry Knowledge

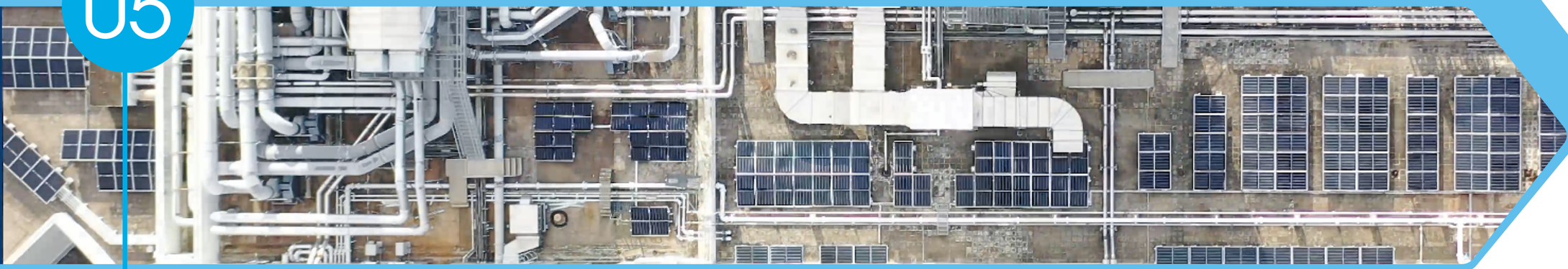
- **Sustainability Literacy Assessment:** Conduct sustainability literacy survey for staff and students.

Drive New Initiatives

- **Strengthen Coordination of Net-Zero Aligned Research:** Establish the Net-Zero Research Committee.
- **Evaluate Sustainable Lab Certification:** Assess lab certification schemes to guide and support sustainable lab practices.

Key Achievements and Upcoming Activities

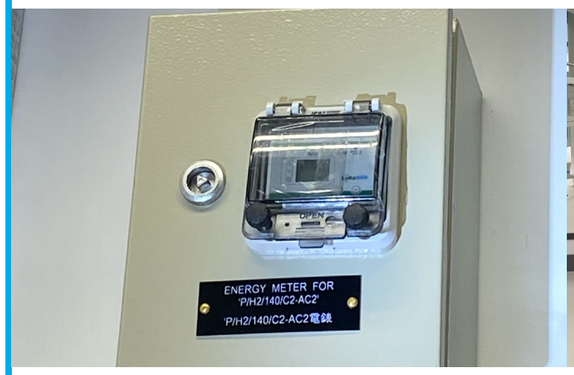
05 Create Sensible Cost-Recovery Mechanisms to Fund Decarbonization Actions



Past Year Achievements

On-Campus Project Implementation

- **Selected Wireless Submetering Technology**
  Identified suitable wireless submetering technology to measure energy intensity of spaces by campus users.
- **Enhanced Energy Data:**
  The new Martin Ka Shing Lee Innovation Building will be the first laboratory building with room-level submetering information.



Upcoming Activities (3 Years)

Drive New Initiatives

- **Cost Recovery Mechanism:**
  Implement Phase I of cost recovery scheme in Martin Ka Shing Lee Innovation Building.
- **Develop Fee Based System for Data Center Usage:**
  Implement managed services charges for the new High Performance Computing 5 building.
- **Pilot Granular Energy Data Collection:**
  Implement submetering pilot to achieve room-level energy monitoring.