Sustainable Smart Campus Net-zero Journey: Innovation Challenge

Project list (English Only)
Winner

EcoPrana - a net zero pavilion for HKUST members to relax and reduce stress

- **UST IS STRESSED OUT!**
  - 60% of students and 60% of staff are struggling with distress
  - Academic focused culture, not enough focus and talks to encourage achieving eustress

- **NON-HUMANISTIC DESIGNS**
  - Lacks health-focused facilities AND nowhere to simply lie down & relax
  - Sophisticated designs may not be better than nature (in terms of both health and energy usage!)

- **BREATHING GLASS**
  - Two layers structure: Translucent solar panels & photocative glass
  - Rhythmic light transmission → mimic relaxing breathing

- **HYDROFEATURES**
  - Collect rainwater from runoffs and potentially domestic AC condensation
  - Used for irrigation of green wall
  - Further collected to pass through a calming water turbine for calming sounds

- **NATURE SOUND SYSTEM**
  - Inspired by existing SSC project, relaxing micro-therapeutic sound will be played in the space
  - Include recordings: HKUST’s birds & natural sound of running water

- **MINDFUL BUILDING MATERIALS**
  - Construct with materials like micro-fiber bricks, recycled glass & bamboo
  - Moss used on green wall can improve indoor air quality and reduce dust
  - Flexible furniture for mixed use purposes

**Why can it benefit both campuses?**

- Distress would probably be a universal issues under UST’s culture
- Plenty of natural scenery and water resources on both campuses
- Transferring existing SSC projects on CWB to GZ, and making them visible!
First runner-up

**Wasteless Canteen** - a waste reduction program in HKUST canteens
Second runner-up

**Close the Gap** - a mobile app that promotes sustainable behaviors

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**Close The Gap**

**SUSTAINABILITY SYSTEM INNOVATION**

**THE HOME OF SUSTAINABLE INCUBATION**

- CTG platform is designed to connect our sustainable smart campuses together with millions of improvement ideas.
- With a tap of student ID or by scanning QR code, you can update your progress in carbon emissions saving to our platform.

**PROFESSIONAL COMMUNITY**

**GET INVOLVED**

- Making sustainable behaviors visible and quantifiable;
- Nurture Students’ habits with multi-dynamics sustainable events in both Campuses

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Mark and Reward your contribution to sustainability with:
- blockchain certificates
- memorable souvenirs

Scan our QR code, and have a taste of our **PROTOTYPE**!

There are more pages unshown waiting for you to explore!
Other participating teams:

**TURING** - a net-zero campus using artificial intelligence

*AI is a differential equation
*Net-zero is a boundary condition
Green Beacon - improving campus user experiences using IoT

HKUST with Green, Sustainable and High-Performance IoT

Objective
HKUST members need a way to enhance food and campus experiences because they can be more productive, less stressful and be smart, strong and sustainable.

Applications
- Healthy and Delicious Foods
- Enhance Dining and Campus Experiences
- Marketing Contents and Food Promotions
- Asset Tracking and Indoor Navigation

Operation
- Beacon
- Customer Interaction
- Content Cloud Server

Prototypes
- Fixed angle, one-time and auto-adjustable panel angle
- Cloud and analytic solution
- More sustainable and efficient than conventional battery-powered beacons

The Team
Perrin Somsawad
Muhammad Zeeshan Akber
Yeming Zh

MOVetivation - a mobile app linking to electricity-generating bikes

Wanna charge your phone & recharge yourself?

GET ON OUR ELECTRICITY-GENERATING BIKES!

Sustainable
Generate alternative energy for the campuses & allow you to charge your phone

Convenient
Available at different spots of the campuses & remind you to maintain physical health

Stress-relieving
Allow you to take a quick break from your study & give yourself endorphins to boost your mood

Make it fun!

Presented by:

Angela Leung  Anson Wan  Sommi Cheng
CL Air Renew - power air filtration system using wind energy

Air filtration system tackling NO2 emissions and PM 2.5 particles, powered by the very thing causing them - moving vehicles

PROBLEM

Hong Kong’s roadside pollution has stayed double that of WHO’s recommended safe level. HKUST has a steady flow of vehicles contributing to NO2 and PM10 emissions across the campus. Franchised busses in Hong Kong alone are responsible for one fifth of all air pollutants in Hong Kong. Guangzhou has been affected by pollution heavily enough for citywide busses to be revamped to electric. It is unknown if Campus shuttle buses will be electric or not.

The recommended NO2 levels as monitored by WHO must stay less than 40 µg/m³. We estimate this to be higher across the South East Asia or areas where vehicles traverse more frequently. Monitoring the air is not enough. Filtering and treating the air sustainably is the need.

REQUIREMENT

Products such as the MANHURMILL Filter Cube helps to improve air quality in places with high air pollution - such as traffic junctions / busy roads or bus stations. A filter column with three Filter Cubes is able to clean 14,500 m³ of air every hour and consumes 1500 W per hour.

It may not be necessary to power this air filter 24 hours a day, but to turn it on when needed with a relay switch connected to the SCU/ air network to understand what levels it needs to be turned on!

NET ZERO COMMITMENT

If the power running the filters is produced from fossil fuel, it seems hypocritical to the mission. A sustainable net zero way to power the filter is to harness wind energy from passing busses!

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Several consistent busses moving creates emissions on campus but also causes airflow which can be harnessed by vertical wind turbines.

This concept with a vertical wind turbine wall is capable of producing a severely conservative estimate of 8-80 kW/h in a day. This energy is what will help clear the air.

Wind turbines can rotate upon wind elbow for buses passing by.

NO2, PM10, and other particulate air pollutants are allowed by MANHURMILL Filter Cube.

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