

# Sustainable Operations External Advisory Group

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FINDINGS AND RECOMMENDATIONS



HKUST Sustainable Operations Executive Committee  
MAY | 2016

## Sustainable Operations External Advisory Group

### Findings and Recommendations

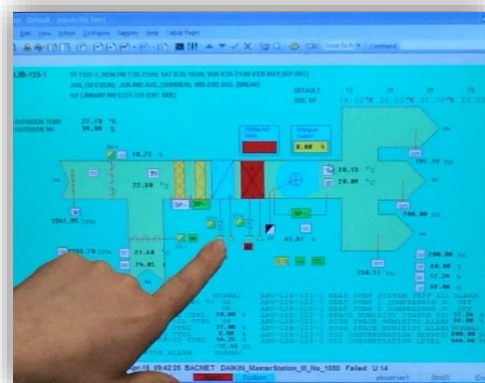
From April 10<sup>th</sup> through 15<sup>th</sup>, 2016, HKUST hosted a three-member Sustainable Operations External Advisory Committee to meet with our operations teams, take a close look at our campus and building infrastructure, and review our data and other relevant information. The Committee was encouraged to challenge our assumptions and explore creative new ways to approach some of our most pressing operational challenges. The timing of the visit was to correspond with the development of HKUST's 2020 Sustainability Plan, with their input helping to shape our thinking on resource reduction goals. To facilitate the visit, HKUST contracted The Purpose Business, a local consulting firm with specific expertise in Hong Kong sustainability issues. This report is the culmination of their joint observations.

### General Overview

Over four intensive days, the Group met with HKUST staff, students, faculty, and Hong Kong sustainability experts to get a sense of what kinds of opportunities were available for the university.

Recognizing that Hong Kong – and the HKUST campus – has unique challenges at this stage of sustainable development, the group found good reasons for optimism. First, HKUST already has made great strides in developing a sustainability platform, and several ongoing actions and activities demonstrate a strong commitment to making progress in our sustainability goals. For example:

- The energy team has aggressively undertaken energy efficiency measures in efficient lighting, equipment upgrades, and utilizing the BMS (Building Management System) system to reduce energy during off-peak times.
- Ongoing benefits from the Seawater Cooling plant.
- The Library is planning a ground-breaking sustainability-themed conference that will demonstrate a broad series of sustainability-related actions for participants to experience, and will set the precedent for future green conferences held on campus.
- The laboratories have evaluated and installed state-of-the-art ventilation equipment in the newest lab building (CYT) that cut energy use from fume hoods significantly. That, plus the ongoing work of the Green Labs Working Group,



demonstrates an aggressive commitment to the goal of constant improvement of performance.

- The incorporation of students into project work shows that there are strong and growing synergies between the educational and operational sides of the university.

However, HKUST can't rest on its past sustainability achievements if it is to be a world-class university at the cutting edge internationally. Looking not just at universities, but also progress being made by business globally, HKUST needs to keep broadening and deepening their sustainability achievements.

## **Relating to Sustainability Goals**

One of the main questions for the advisory group to consider during their time on campus was whether HKUST's proposed 2020 goals and targets were reasonable, feasible, and attainable.

Those proposed 2020 goals are:

- 10% reduction in electricity based on 2014 levels
- 50% reduction in waste based on 2014 levels



The members of the advisory group thought the waste reduction goal was challenging, but recognized that capturing and processing food, landscaping, and animal bedding wastes would go far in terms of reaching that goal. For electricity, they were unanimous in their belief that the goal was well within reach. They pointed out several reasons for this:

- There are clear opportunities for energy reductions within the buildings, labs, and data center by focusing on energy “waste.” The group clarified that waste is not necessarily the result of energy management, but rather the limitations on past technologies. As new equipment, sensors, and software tools become available, they offer additional ways to reduce energy without sacrificing safety, comfort, or productivity of building occupants.
- The amount of heat generated from the cooling plant is currently a challenge to manage, but could become an opportunity for energy capture and utilization.
- The schedule for large equipment replacement – such as the large chillers in the cooling plant – provides opportunities to increase efficiencies as the equipment is upgraded.



- The existing buildings were not designed or built with much attention to insulation or controlling the airflows. The result is a significant amount of conditioned air “leakage” from the building envelopes, which need to be replaced with more conditioned air. Even cutting this leakage by a small amount would improve the performance of the entire air conditioning and delivery systems (and would make the buildings more comfortable).
- A recent study that showed high energy use during off-peak hours suggests that there is a sizable amount of energy being wasted when the buildings are largely unoccupied. Cutting this “phantom” load by just 10% would get us more than half-way to our 2020 reduction goal.



## **Specific Findings and Recommendations**

Since the group was only on campus for four days, they spent their time focusing on broad themes, trends, and issues that signified an opportunity for deeper examination. In the end, the group organized their findings into five main themes.

1. **Knowledge** – there is a great opportunity for the university to jump further ahead by aggressively pursuing, analyzing, and making decisions based on performance data. Currently there are a number of areas of building performance that are inaccessible due to limited understanding of how systems are performing. The high off-peak energy consumption, for example, suggests that some equipment, lights, and systems that are consuming full power when no one is using them. However, without directed metering or means for directed data gathering, the energy managers are effectively “blind” when looking for sources.
  - *Recommendation: Institute a metering program to install and manage data collection and analysis. With the mantra, “you cannot manage what you cannot measure,” the metering program will provide essential management tools for improving performance.*
2. **Policy and Process** – the transition to sustainable operations requires clarity in terms of expectations of university policies (at the top-most level) as well as simple operational procedures at lower levels and embedded throughout the university lines of business functions and faculty. University policies become the guidance many need to help understand how to deal with specific problems as they come up, and give assurance to staff when they develop new projects or ideas for implementation. This sustainable transition requires a role shared by everyone in all departments.
  - *Recommendation: Continue with the development of policies that ensure that new buildings will achieve a high level of performance, and that existing buildings continue to improve when renovated.*
  - *Recommendation: Review and update the Purchasing Policies for consumables and contracted services to include environmental performance criteria. Include in assessments of tenders the operational costs to the environment and ease of recycling the used materials or equipment at end of life.*
  - *Recommendation: If sustainability is to thrive across the university, elements must be embedded in the job requirements and expectations of all university employees so that everyone knows and understands their role. Everyone should have a responsibility to sustainability matters; it is not just the remit of the sustainability team.*
3. **Engagement of Market Expertise** – the group recognized that the Hong Kong market is still developing for the provision of sustainability products, services, and expertise, and that it would be incumbent upon UST to help lead that change through our engagement with local service providers. This means knowing what “best in class” performance is internationally, demanding it from our contractors, and holding our contractors to high standards.
  - *Recommendation: Look outside of Hong Kong for “best in class” examples of performance and operations, and incorporate elements in tenders and contracts. While the Hong Kong industries are developing, HKUST can facilitate this development by understanding these elements and working with local contractors to meet these high levels of performance.*

- *Recommendation: HKUST looks to work with providers who have shared value and attention to service. HKUST buyers should be encouraged to investigate and make enquiries as to what HKUST is asking for. Value for money should be a factor in the purchase decision. Being driven by “best purchase price” can lead to less than optimal decisions in the long run.*
- 4. **Resourcing for Success** – the group found that there are a number of areas where the university would benefit from specific skills and expertise to help with our reduction goals. Even if we already have staff with some of these skills, the group highlighted the experiences of our peer universities around the world where having dedicated staff members devote their full attention to these issues produce the best benefits.
  - *Recommendation: Hire an energy efficiency specialist, someone with a strong engineering and energy background, with the tasks of evaluating project plans, researching new technologies, and evaluating new approaches to energy savings.*
  - *Recommendation: Hire a utility analyst to help with the assessment of utility consumption, data analysis, review of billing, and compilation of reporting.*
  - *Recommendation: Hire a sustainable landscaping specialist – someone who can focus on outdoor spaces, making them more livable and aesthetically pleasing, and help with strategies to reduce the large amounts of landscape waste now going to the landfill.*
- 5. **Community Engagement** – the group recognized that most of the sustainability features of the campus are largely invisible to the campus community, and that focusing on making some of these features more visible would help with the communication of our goals and priorities.
  - *Recommendation: Identify projects that are helpful in achieving our objectives, have an obvious educational benefit, and then install them in highly visible places where they become the focus of the campus community.*
  - *Recommendation: While renewables may not represent a large opportunity for reductions, they should remain a part of the discussion because they are part of the campus dialogue and promotion of sustainable behaviors.*
  - *Recommendation: ‘Sustainability’ could be a theme of engagement with the students and could be used as a means to create a more informed, active, involved and caring community.*

## **Concluding remarks**

It was encouraging to see how interested most staff and students were in making HKUST a more visible sustainability leading university, from both it's academic successes and campus operations. HKUST has a superb physical location from which to lead the growth of sustainability in Hong Kong and the region.

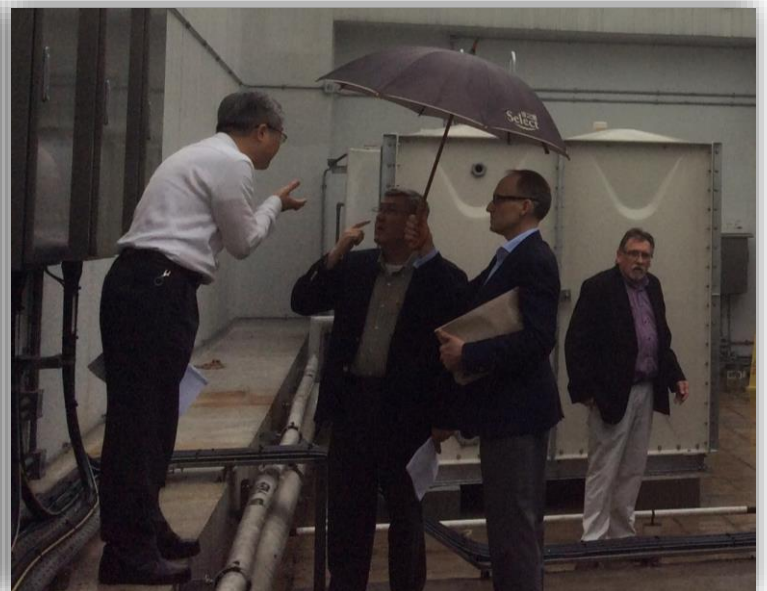


## **Further ideas**

The External Advisory Committee and The Purpose Business created an extensive set of notes and observations from the 4 days. While the key ideas have been discussed above, the following bullet points are supporting and additional questions or ideas taken from those notes and worthy of more discussion.

- What does Zero Waste mean to HKUST? For example, having a contractor take away all food waste from the campus does not guarantee zero waste. Can upstream decisions be reviewed for food as well as other inputs causing waste?
- The Seawater Cooling Plant is very clean and tidy, as well as interesting and a great learning opportunity. Unfortunately the facility receives only 2-3 visits per year from student groups or faculty. This is a great opportunity to increase student and staff visits.
- Utilize more of the rainwater runoff, not just for irrigation but also for mini-hydro.
- Undertake laboratory utilization studies to determine within any 24-hour period what facilities really need to be operating 24/7 and establish simple procedures to have laboratories opened after hours if required.
- Develop partnerships for the recycling of LED lights, and other e-waste, while waiting for EPD to expand the fluorescent tube collection scheme.

- Investigate training students on how to use the current food composter to improve the utilization of the composter. In a similar vein, students and or other campus workers can be trained and empowered to undertake soft energy audits, to informally fine tune wasteful energy consumption.
- The current allocation of budgets for furniture (50% split between FMO and faculty) seems to result in more new furniture being purchased and old furniture wasted.
- There is currently no incentive for departments to consider the end of life process as part of their purchasing decisions.
- Should there be a conversation about how the university endowment is invested?
- Hosting a citizen science programme and bio-blitz would raise the awareness of the biodiversity on campus.
- What are the commissioning or recommissioning policies for infrastructure?
- Who is providing advice on energy saving settings for electronic equipment in offices, such as computers or printers or monitors?
- How can HKUST improve the way that top management shows their commitment to sustainability? Is driving a Tesla seen by the students as being trendy or true sustainability?
- Students disappointed that HKUST could not provide space for an on-going goods collection/exchange point.
- There are only several vegetarian dishes across all university food outlets. Food portions are generally too large for many students.



## **Members of the Sustainable Operations Advisory Group**



**Mr Edward Kirk CEM,**  
LEED AP

***Facilities Director at New Canaan Country School and responsible for all Facilities, Safety and Security and Sustainability.***

*From 2010-2015, Ed was Energy Reduction Manager for Johns Hopkins University. As an internal consultant for each of JHU's schools and campuses, Ed worked to help identify and evaluate energy reduction projects to help reach the JHU goal of eliminating 50% of their Greenhouse Gases by 2025. Ed has 30 years of Facilities design and operations experience, most in educational institutional environments, during which he designed, implemented, fixed and optimized many energy efficiency, conservation and renewable energy projects.*



**Dr. Roddy Yarr BSc,**  
PhD, MEnvS, MIEMA,

***University of Strathclyde as Assistant Director (Sustainability and Environmental Management)***

*Roddy Yarr is a Chartered environmental expert implementing practical energy and sustainability solutions. Roddy joined the University of Strathclyde from St Andrews University where he established a team to deliver improved environment, energy and sustainable development performance. Roddy recently moved to the University of Strathclyde as Assistant Director (Sustainability and Environmental Management) with responsibility for delivering a 25% carbon emissions reduction by 2020. Roddy's collaborative style, his passion and practical approach mean that he is able to positively influence people and implement solutions that reduce resource use, cutting carbon emissions and saving on costs.*



**Mr Bart Meehan**

***Visiting Fellow, ANU Fenner School of Environment and Society.***  
***Formerly: Associate Director, Facilities and Campus Services, ANU***

*Bart is currently a Visiting Fellow and Research Associate in the Fenner School of Environment and Society, The Australian National University. Prior to his retirement in 2012, he was the Associate Director, Facilities and Campus Services at the University. Bart was responsible for creating the University's Environmental Management Program (aka AUNgreen), writing University Environmental Management Policy and the Environmental Management Plan. He was a founding member of the Campus Environmental Management Committee and subsequently had organizational roles in sustainability for various international and national groups.*

***We are also grateful for the expert guidance, insights, and organizational capabilities of Dr. Merrin Pearse and Ms. Fiona Donnelly of The Purpose Business.***

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