Breakout session 1: Building, Culture, Wellbeing

(1) Richard Boyd - Servicing the circular economy

- Collaboration with UCL, Schneider Electric, AECOM, ARUP
- Circular economy (CE) is critical for SDG goals
- Goal: Keep resources in place to benefit the most from it
- Looking beyond current building standards
- Application to real test case was wanted → Marshgate project
  - Mixed building project
  - Use for living, teaching, eating, etc.
- Barriers/Challenges of CE:
  - Universal (simple, easy buildings, better to change and adapt to different needs → usable on a larger scale)
  - Joint venture (share gains & pains, align stakeholders responsibility, rewarding joint ventures, product as service models)
  - Self-sufficient (less waste, reuse of waste and resources)
  - Passive (minimize use of active systems, create environment that needs no active systems)
  - Pre-loved (incorporating second-hand equipment in new buildings, increased market need & value of 2nd hand equipment)
- Identification of cross-cutting themes through interviews
- Barrier: Lack of data (e.g. about performance of passive buildings or how well 2nd hand equipment is performing)
- Opportunities: Cost & value performance (lower risk)
- Collaboration: Being clear about preliminary outcomes & communicating them (collaboration needed for sharing data); C. throughout whole supply chain
- Challenge: Think beyond traditional sustainability in areas of business model
- Most difficult scenario? 5 scenarios are not supposed to work individually, but all together complementary; Pre-loved is most difficult → no market maturity
- Current draft: Set of questions about the purpose → different set of scenarios as answer
- Currently focus: Understand people’s perceptions and needs
- Difficulty:
  - How will needs look like it 60 years? Scenarios shall define barriers
  - Project definition
  - Assessment themes
  - Creating long-term value

(2) Mari Läyttiniemi - Aalto Green Campus and new headquarters in Dipoli building

- Otaniemi: Main campus of Aalto University in Espoo, Helsinki
- Concentration on only one campus (while earlier there were three)
Outside energy production at campus: solar, wind, geoenergy, geothermal → results communicated through lobby displays

ACRE: Aalto University Campus & Real Estate (drivers of project)

Goal 2030: To be self-efficient, but might be too challenging

Main building (Dipoli): Auditorium, meeting rooms, restaurants, offices, etc. → multi-purpose

Hot-desking: No one has a desk of their own in the building (not even the president)
  - Argument: cost-saving
  - It was tried out by a part of the employees before
  - It can be very challenging, the opinions about it vary

Dipoli’s initial purpose: Student union building
  - completed in 1966
  - in 2010: bought by university
  - renovation: 20 months
  - cost: 24 Mio. €
  - building is protected, since it is Finnish heritage
  - 14,000m² surface

Geoenergy in the building
  - 17 dwellers
  - provides currently ~50% of heating & cooling of the building (more cooling)
  - expectation to last at least 25 years
  - investment (total): 250,000€
  - payback time: 5-10 years
  - possibility to install solar panels

Other sustainability aspects:
  - safety during renovation
  - service design as a tool → including all stakeholders
  - recycling
  - ...

Academic collaboration & user engagement in workspace design
  - Energy solutions: e-cars & campus bikes
  - Learning restaurant: Healthy & veggie favourable
  - Exhibition space: Strongly visible arts

“The building is only a beginning. It’s not ready neither final - rather an endeavour or direction” - the architect

Biggest challenge: high number of stakeholders → lots of expectations to align

Challenges/opportunities from old building:
  - 4th floor was too expensive
  - Disappointed that no solar panels could be installed (so far)
  - Not all spaces were redone (e.g. gala hall)
  - Original walls were kept → no specific need for new insolation

Data of project is shared online for academia & research → most difficult resource: manpower to clean it up
- **Hot desk:**
  - for space reduction reasons → Is it actually reasonably/efficient on comparison to the employee efficiency?
  - but they need to make “space” for more people
  - reduction of 30% of space
  - people are mostly happy about activity-based working space
  - support of students to use their own devices
- **More awareness should be brought to stakeholders → it’s kind of invisible**

(3) Syam Kumar Prabhakaran: Improving energy efficiency through policies and technologies (National University of Singapore (NUS))
- **Roots:** 1905, main changes in 1980
- **NUS sustainability steering committee**
  - Energy Task Force (created 2012)
  - Water Management Force
  - Waste Minimalism & Recycling
  - Built Environment
  - Green Space
- **Goal:** low carbon campus through engineering and tech & practices & policies and management
- **Tool:** Energy Monitoring (EUI) - Comparison actual vs. target
- **Policies:**
  - pay-as-you-use for research institutions/centers&admin
  - → empowerment of occupants
  - → savings returned to user
  - → student housing: pay-as-you-use-cards for air conditioning
  - green procurement (e.g. freezers & cabinets)
- **Technology**
  - chiller plant consolidation
  - chiller plant efficiency improved by 24% + reduced number of chiller plants needed
  - laboratory air change
    - local fire code requirements
    - lab ventilation risk assessments (hazardous substances, activities in lab, heat lead & ventilation demand)
    - optimization of air changes in lab
  - LAB - policies
    - optimal lab layout (space usage)
    - separated air conditioning systems
    - adaption of tech according to need
- **Recognition:** First green mark platinum lab; pioneer university of applying systems
- **Next steps towards low carbon campus**
  - district cooling system
  - use of renewable energy
  - SMART campus (test bed for smart cities)
○ use of tech & IT in every optimization (→research collaboration + use of business analytics)

- Current/future:
  ○ strong focus on labs
  ○ key focus of energy consumption
  ○ more challenging in tropical climate
  ○ new building 15-17 levels, labs on high stories
  ○ extra cooling/heating had to be paid
    ■ strong incentives are needed
    ■ most efficient way of making people aware
    ■ practical solutions for changing mindset
  ○ currently faculty pays bills
  ○ smart city movement helps creating use zones → also the smaller the zones, the more data, the higher the need of workforce for handling the data

(4) Tomas Refslund Paulsen: Sustainability at Maersk Tower (Copenhagen University) - opened 2017
  - research & lab building
  - faculty of health science was needed
  - incorporation in existing environment
  - basement: 2 stories of public open space areas (canteen & class rooms) + 15 stories of research levels + top floor: open to public
  - competition for building in advance:
    ○ focus on sustainability
    ○ fitting into environment
    ○ asset for the area
  - sustainability aspects:
    ○ energy: high degree of control and monitoring of energy consumption
    ○ solar panels exist, but can only cover minor part of energy need
    ○ more efficient: integrated sun shading → reduction of need for colling
    ○ there is lot of control and monitoring in building → challenge in tech competencies
    ○ sustainable laboratories
    ○ strong focus on flexibility (borderless & open transition spaces)
    ○ ventilation can be changed (e.g. from office to lab space)
    ○ “freezer” hotel in the basement with district cooling
    ○ usually labs are pretty closed up; here: open space, plazas on every floor → sharing of best practices and experiences in the design of the building
    ○ loop ventilation for more flexibility & energy optimization
    ○ rain water
      ■ collection & use of rain water
      ■ focus on how to manage heavy rains
      ■ big storage tanks of rain water (used for toilet flush, etc.)
- green roofs → cooling & biodiversity
  - a building for bicycles
    - high priority for biking facilities
    - parking outside and inside, path through the building
  - contribution to the city
    - public canteen & café
    - campus park (native trees + grasses as well as more tropical ones)
- [www.greencampus.ku.dk](http://www.greencampus.ku.dk)
- Challenges:
  - get ventilation & energy system to work
  - goal: need only ⅔ of energy of a similar lab space
  - project manager was strong driver and keen to reach sustainability goals →
    key ambassadors are important to have onboard
- A few old buildings had to be abandoned for this, but an increase of students, teachers & conducted research could be identified
- Labs are more complicated than other building plannings → tech isn’t always the answer to sustainability, also design solutions could be
- Is it adopted by the public? → It is used by students and locals for picnics, etc.
- Cost factor: 200 Mio. €