

WTUN: How Can the Collective Deliver Impact on Sustainable Cities and Communities?

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Vice President for Research Strategy, King
Mongkut's University of Technology
Thornburi



How can the collective impact be delivered on sustainable cities and communities?

Sustaining Bangkok through the Innovation District Project:
Case of Klongsan Innovation District
Bangkok, Thailand

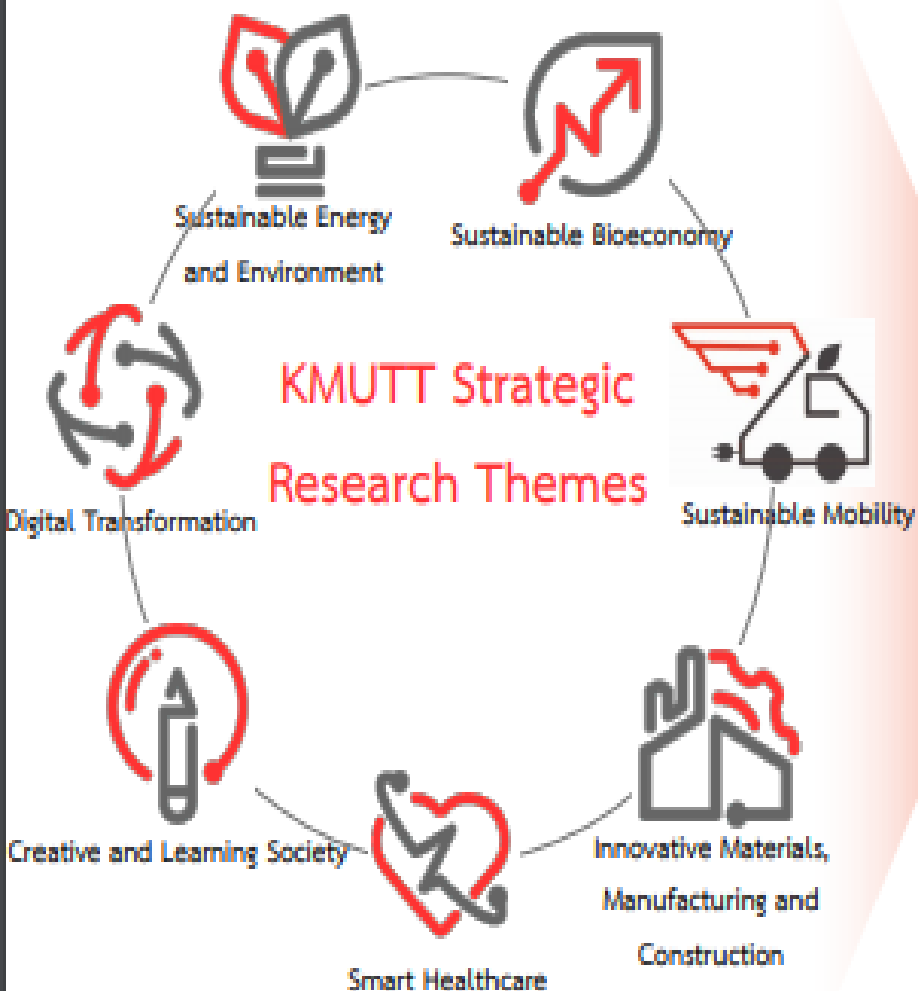
2 October 2019



GOAL

- By 2030, ensure access for all to **adequate, safe and affordable housing** and basic services and upgrade slums
 - By 2030, provide access to **safe, affordable, accessible and sustainable transport systems** for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
 - By 2030, enhance **inclusive and sustainable urbanization and capacity** for participatory, integrated and sustainable human settlement planning and management in all countries
 - Strengthen efforts to protect and safeguard the world's **cultural and natural heritage**
 - By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by **disasters**, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
 - By 2030, reduce the adverse per capita **environmental impact of cities**, including by paying special attention to air quality and **municipal and other waste management**
- By 2030, provide universal access to **safe, inclusive and accessible, green and public spaces**, in particular for women and children, older persons and persons with disabilities
- Support positive economic, social and environmental links between **urban, peri-urban and rural areas** by strengthening national and regional development planning
 - By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans **towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030**, holistic disaster risk management at all levels
 - Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials

R&D to support KMUTT's 12th strategic development plan



Goals of the 12th plan

- Quality graduates
- Excellence in RDI
- Internationalization
- Quality services (internal processes)
- Ecological and societal friendly development
- Network and partnership

Strategic Goals in Research

Deliver high impact research through:

Training high quality researchers and conducting excellent research that add value to the economy and society

Creating eco-systems conducive to fostering innovation and entrepreneurship to support the drive towards an innovation-driven, high-value economy

KMUTT Campus

Ratchaburi Province



Residential College
& Social Lab

Bangmod, Bangkok



Main Campus

Bangkhuntien, Bangkok



Science & Industrial Park
& Translational Research

KX, Bangkok



Knowledge
Exchange

An open Innovation and
entrepreneurship platform

Faculties/Schools

Undergraduate and Graduate Programs

Engineering

Science

Industrial
Education
& Technology

Information
Technology
(IT)

Architecture
& Design

Liberal Arts

Graduate Programs

Graduate School
of Management
& Innovation

The Joint Graduate
School of Energy and
Environment (JGSEE)*

Energy
Environment
& Materials

Bio-Resources
& Technology

**JGSEE Inter University Consortium*

Sustainable Energy and Environment

- Energy efficiency (building, industry, etc.)
- Renewable energy (biogas, biomass, solar, small hydro)
- Energy system integration (smart microgrids, storage)
- Earth systems & climate change
- Environmental tech (air, water, soil, waste)

Digital Transformation

- Robotics
- Internet-of-things (IOT)
- Artificial intelligence (AI)
- Machine learning, big data
- Quantum technology
- Smart services & products

Creative and Learning Society

- Art & design innovation (art and tech convergence)
- Future living
- Culture & value creation
- Future learning
- Community development & management

- Biopharmaceuticals
- Regenerative medicine (tissue engineering)
- Biomedical materials, implants
- Assistive technology for the aged & handicapped, children with developmental problems

Smart Healthcare

Sustainable Bioeconomy

- Sustainable agriculture (precision farming, postharvest)
- Bio-fuels & chemicals
- Food for the future (food science and engineering)
- Bioresources management & utilization (wildlife, ecosystem)

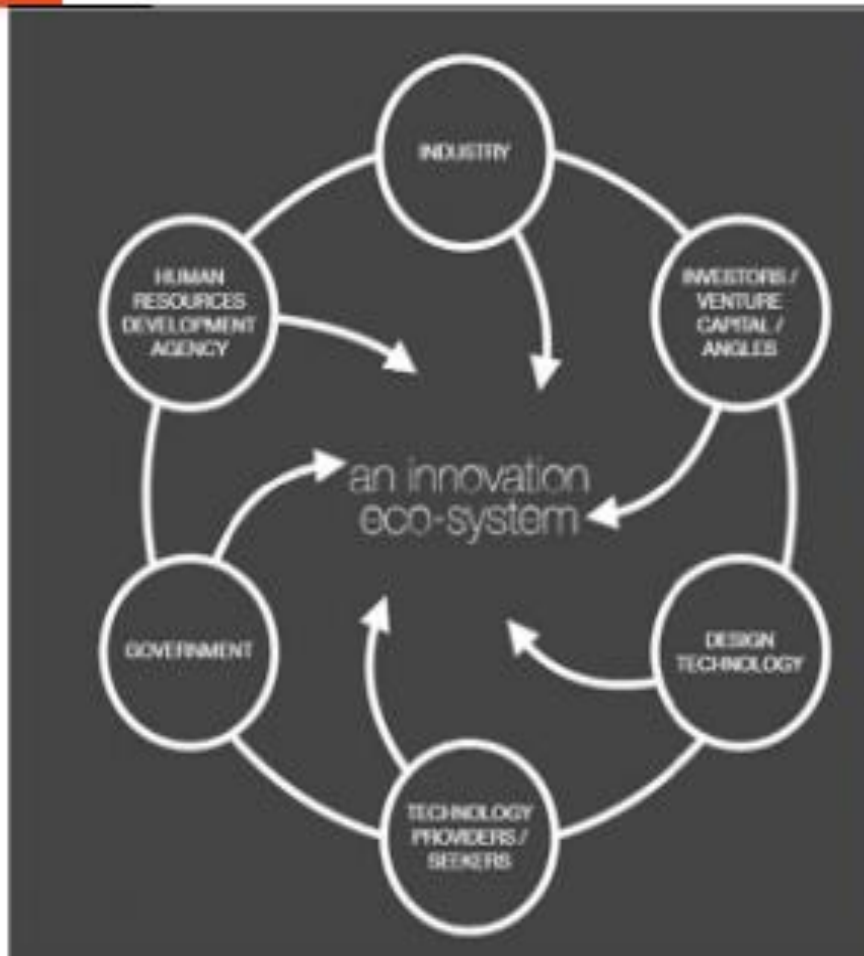
Sustainable Mobility

- Next gen vehicles e.g. EV and infra
- Auto-parts
- Transport safety, policy & planning
- Logistics and supply chain management

Innovative Materials, Manufacturing and Construction

- Materials synthesis & characterization
- Materials processing and forming (polymers, metals, composites, alloys, high strength steel)
- Sustainable construction materials and structures
- Industrial robots & automation, digital manufacturing & construction

KMUTT Strategic Research Themes

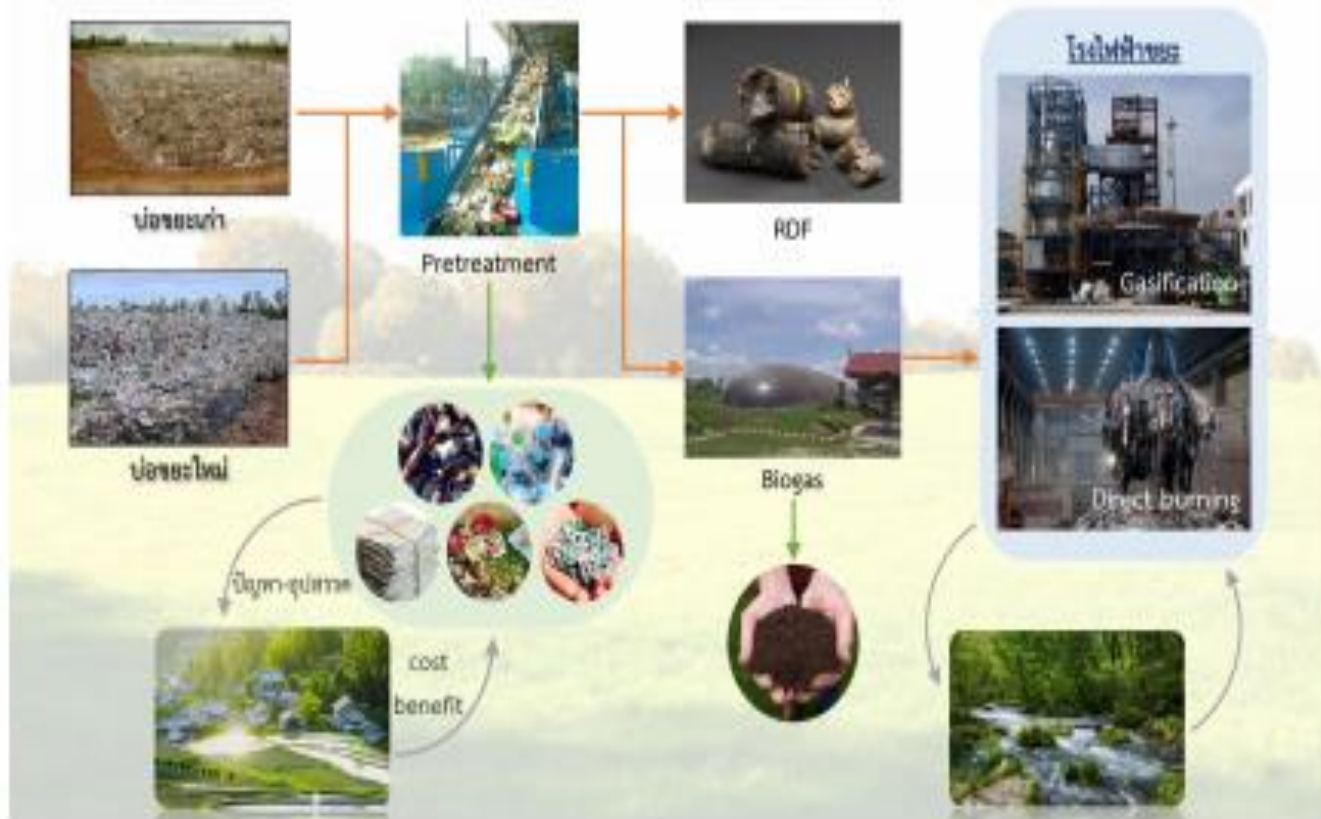




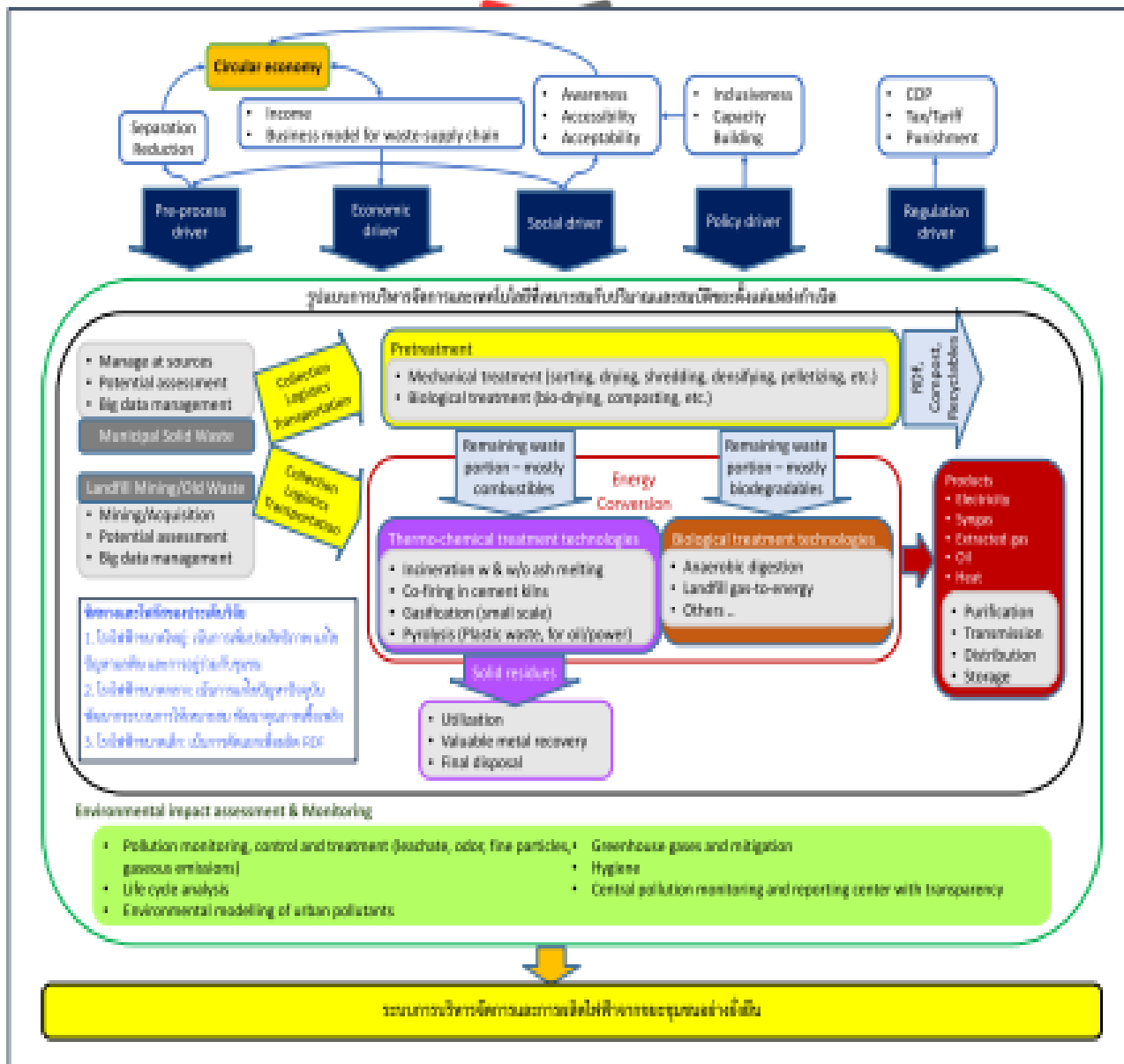
Sustainable Mobility



- Next gen vehicles e.g. EV and infrastructure, e.g. charging station
- **Auto-parts**
- Transport safety, policy & planning
- **Logistics and supply chain management**

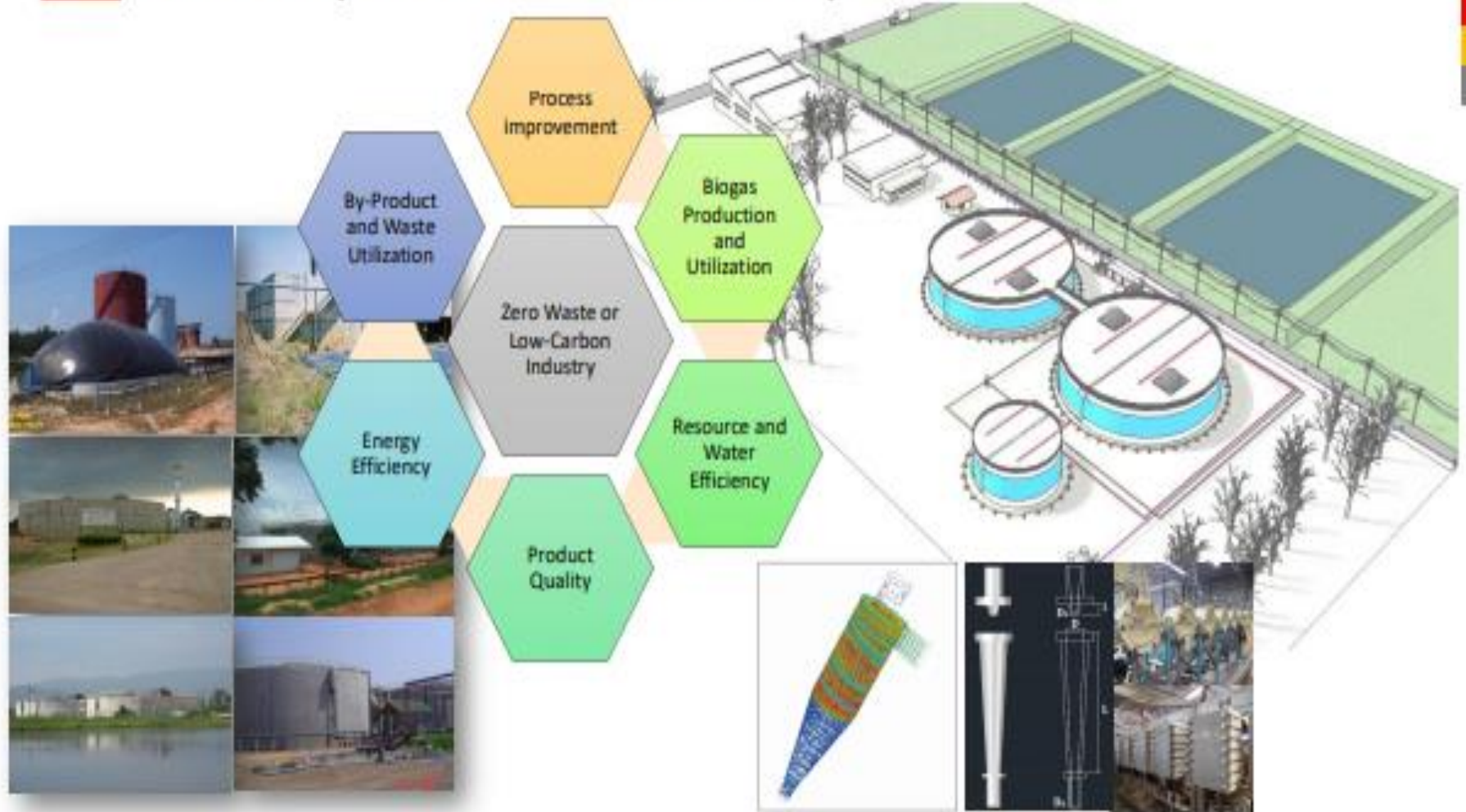


Conceptual Framework



Aiming to Carbon Neutral Industry: Agro-Industries in Thailand

Case study of cassava starch industry





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Facebook <https://th-th.facebook.com/RIPOKMUTT/>



Delivering Impact on Sustainable Cities and Communities

Dr. Rui Wang

Interim Vice-President Research and Innovation

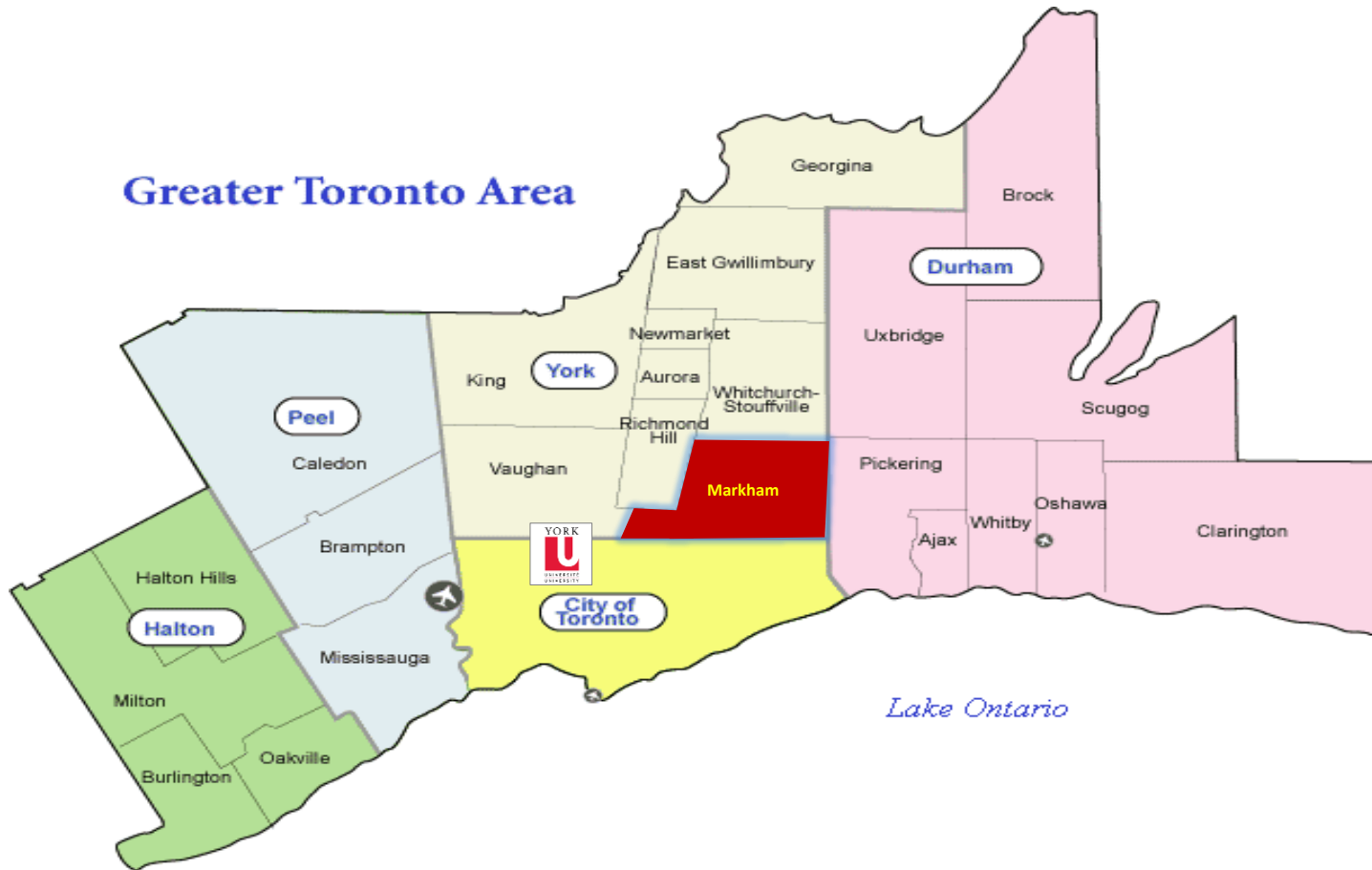
Guiding Sustainability

York's Sustainability Strategy has been developed to inspire positive change, build capacity, empower community members, harness innovation and creativity, and recognize the social, economic and environmental roles of York University in neighborhoods and with our local

President's Sustainability Council serves to foster the integration of knowledge and issues about sustainability into research, education and application.



YorkU and York Region-- Centre of Ontario's New Econ





MARKHAM + RESEARCH IMPACT



YSpace Markham is an innovation and entrepreneurship centre connecting the University to the community. The space encourages idea generation, creativity, entrepreneurship, and social innovation with a commitment to community building and engagement. The space includes a Maker Space, Entrepreneurship Training, Entrepreneurship & Partnership Events, Community Collaborations, and Co-working Accelerator Space

Our Ventures

71



Jobs Created

\$1.3 M



Funds Raised

\$2.4 M



Revenue Generated

Our Community

22



Incubated Ventures

29



Integrated Learning

117



Events Hosted

MARKHAM + COMMUNITY ENGAGEMENT



- Markham Doors Open- 2nd annual Yspace tour- Approximately 200 community members touring Yspace in Markham.
- Markham Cultural Activities Group- Collaborating on culture and art activities in Markham.
- Science Rendezvous Markham- visitors of all ages get a chance to meet with York University scientists in demonstrations and hands-on activities.
- Entrepreneurship programs - LaunchYU (Coaching, Experience, Accelerator); Entrepreneurial Leadership and Learning Alliance (ELLA) in collaboration with 4 small business enterprise centres in York Region; Youth Innovation by Design for high school students; PitchItYork as a platform for local start-ups to make their funding pitch; Food Accelerator Program (5-month program for food and beverage ventures).

MARKHAM + ACADEMIC | YORK UNIVERSITY

- York University Scholars Hub -partnership between the Markham Public Library and York University - the Speaker Series.
- York Talent Hub- linking industry partners with experiential and career supports for students.
- York Region Science and Technology Fair (YRSTF), held at York University, showcases STEM performance of students in Grades 7-12 in York Region.
- CIFAL York- in collaboration with the UN Institute for and Research (UNITAR) and York Region to establish an International Training Centre for Authorities and Leaders at York University as part of an international of training centres.

Markham Public Library and York University present

The York University Scholars Hub

Change How You See The World

Academia for Modern Life
education

Join us as York University presents some of the latest research in environmental sciences and modern academia.

Sep 14: **From the Harper Frying Pan into the Trump Fire: Fighting for Science in a Fake News World**
John Dupuis (Stevac Science and Engineering Library)

Oct 12: **The new York U Markham Campus: Opportunities for Innovation, Sustainability and Experiential Learning**
Jose Etcheverry (Environmental Studies)

Training Information, Search and Diversity
Stacy Allison-Cassin (Scott Library)

(CIFAL) All sessions held at Markham Village branch from 7pm-8:30pm. For more information and to register, visit <https://bit.ly/markhamyorkscholarshub>. Refreshments provided.



University Global Impact R



York University ranked 26th Globally and 5th in Canada in the new Times Higher Education Impact Rankings. Rankings are based on the United Nations' Sustainable Development Goals



Areas where York ranked highly:

- ✓ Sustainable Cities and Communities
- ✓ Climate Action
- ✓ Responsible Consumption and Production
- ✓ Partnerships for the Goals



Sustainable Building Design and Performance

Professor Lynne Jack

Director of Research, Heriot-Watt University, Malaysia

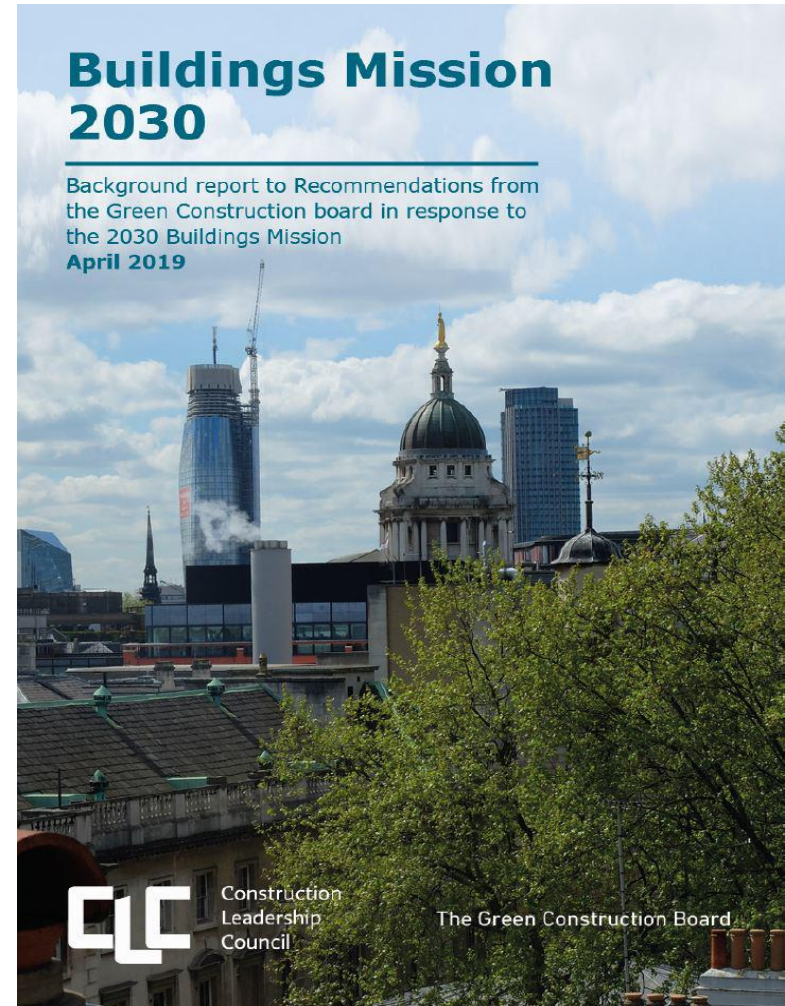
President, Chartered Institution of Building Services Engineers

- Population growth
- Urbanisation
- Megacities
- Energy demand
- Infrastructure provision
- Climate change



UK Perspective

- Climate emergency
- 80% reduction by 2050
- Net zero carbon by 2050
- Clean Growth Strategy
- Fit for the Future



Digital Technology

- An opportunity?
- Digital twins/accessible digital ecosystem
- Governance & security



Skills gap

- Education and training
- Global view
- Known shortfall
- Ageing population
- Collaboration



Teaching and Research

- Cross disciplinary
- UG/PG; degree provision
- Developed vs developing countries
- RAEng Centres of Excellence



- Energy demand modelling
- Energy forecasting
- Aggregate heat and power demand
- Building performance and simulation
- Low carbon energy systems

Sustainability: Harmony between Environmental Impact and Living Quality

Prof. Wei-Hwa Chiang, Professor and
Vice-President, Department of
Architecture, National Taiwan University
of Science and Technology

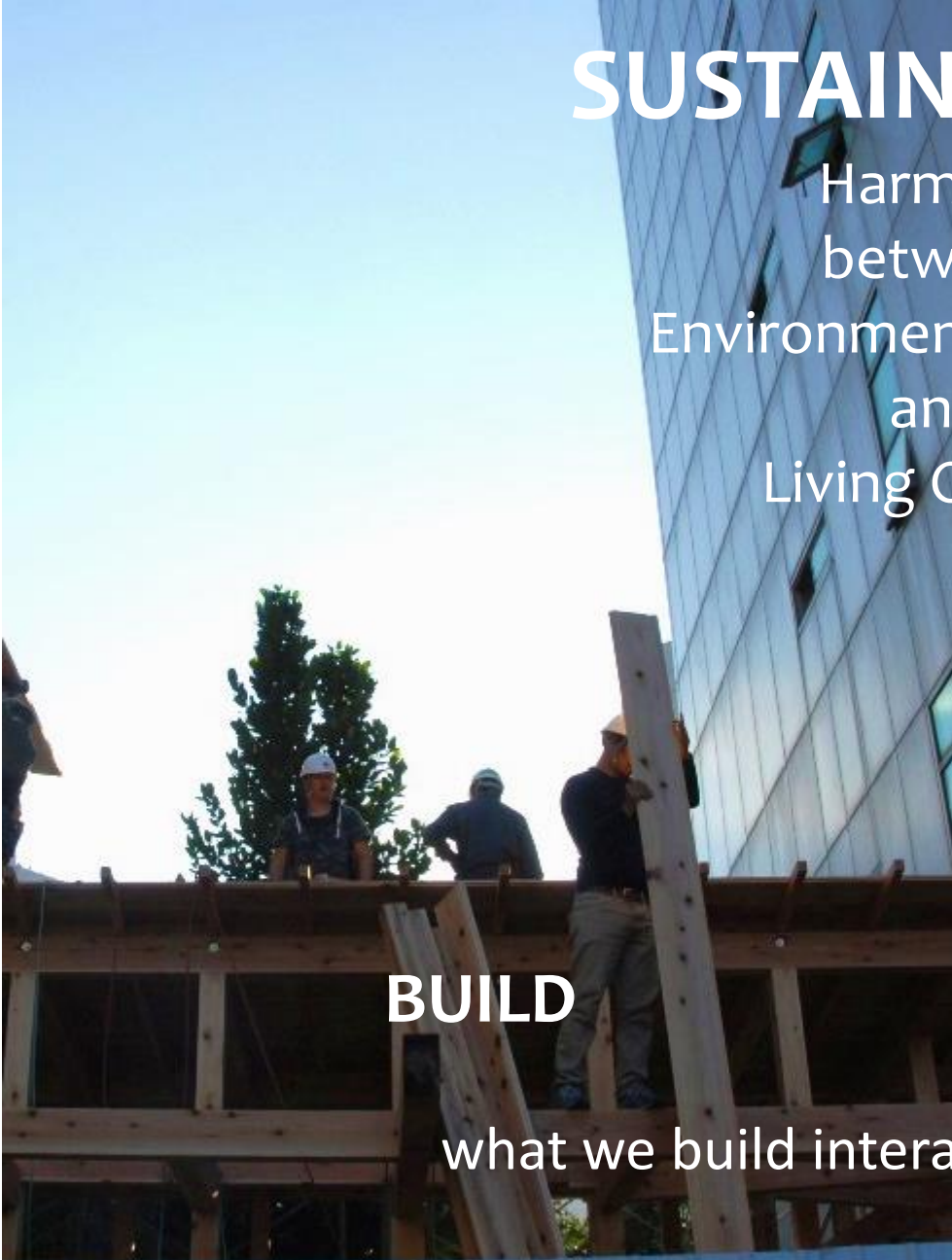
SUSTAINABILITY

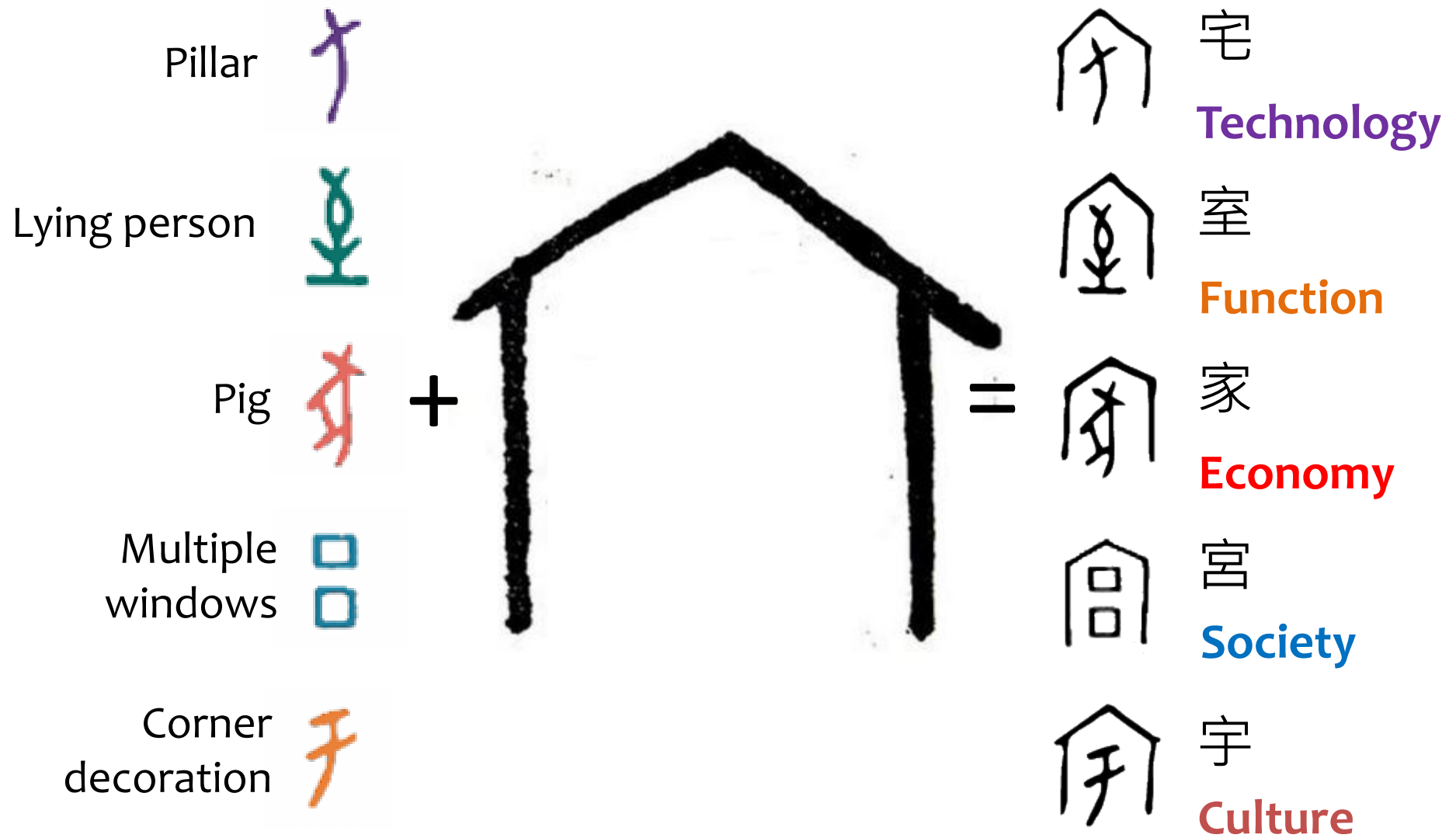
Harmony
between
Environmental Impact
and
Living Quality

BUILD

what we build interacts with how we live.

LIVE





HOLISTIC MEANINGS OF BUILT ENVIRONMENT

from ancient Chinese characters

THE FOUR PILLARS OF SUSTAINABILITY

UNESCO, 2008

Sustained
Planet

Physically
satisfied

Spiritually
fulfilled

Environment

Society

Economy

Culture /
Interaction



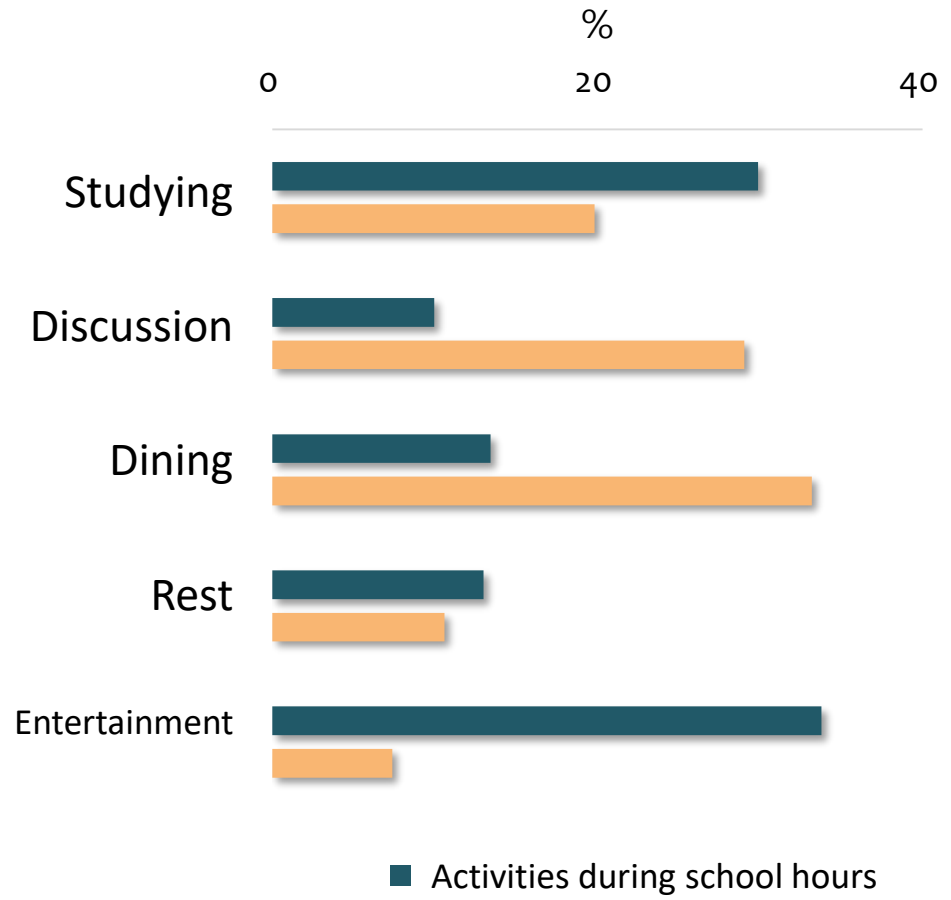
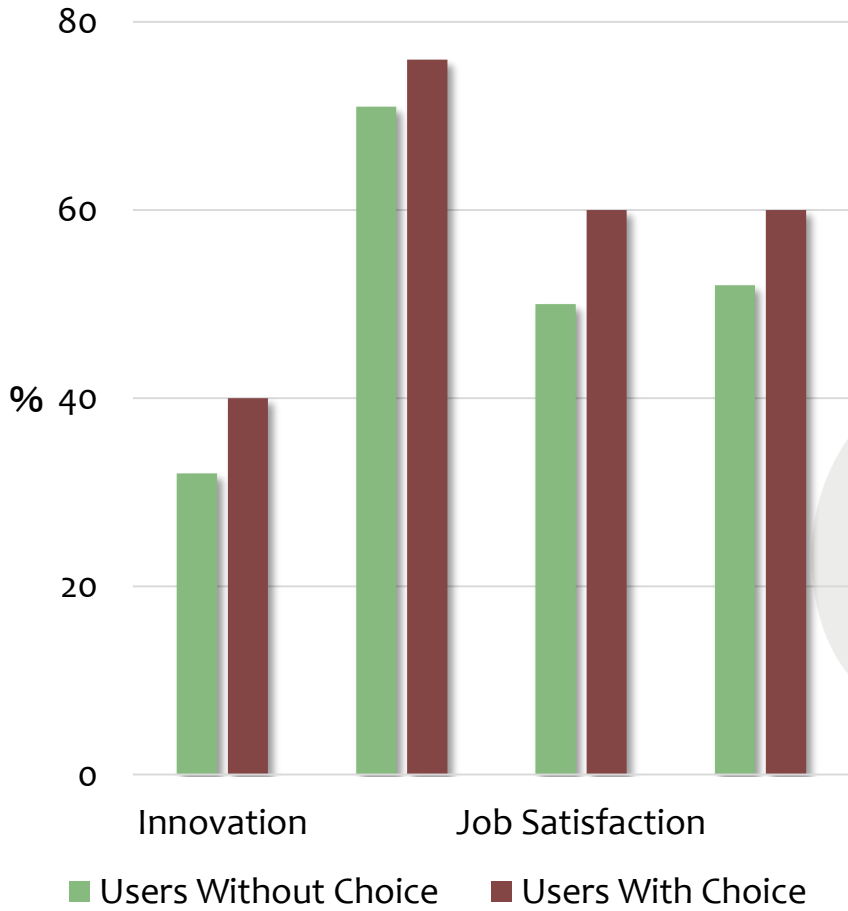
Display of Cultural Information at Vienna Airport Baggage Claim Area

Interactive Resting / Working Area
at Musée d'Orsay METRO STATION



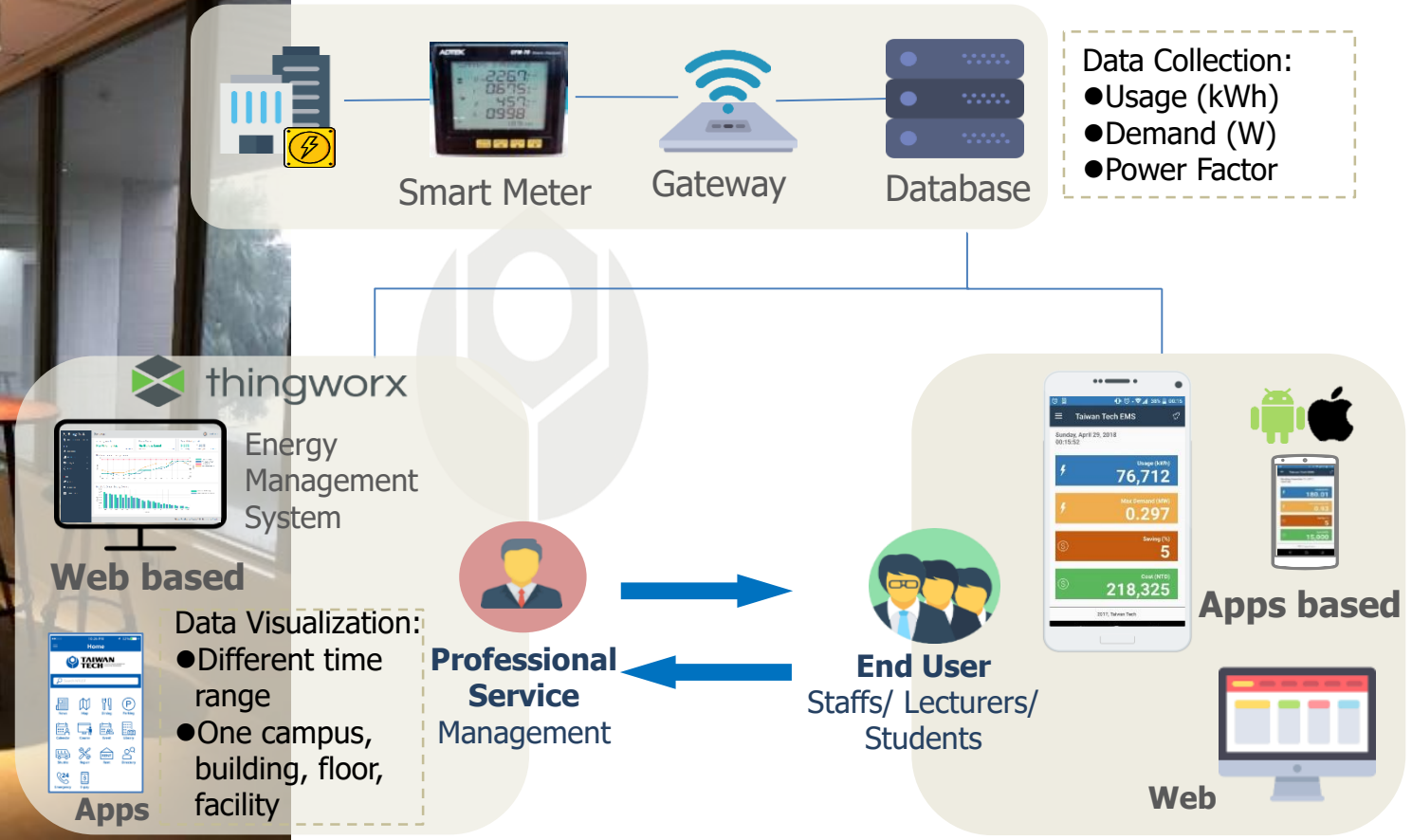
Cultural vitality

DGNB Criteria
for New Urban Development (2015)



Places and Smart Systems

that Create Opportunities of Interaction and Participation at NTUST



UTM Experience in Catalysing Reforms and Driving Innovation in Energy Sustainability

Professor Zainuddin Abdul Manan,
Deputy Vice Chancellor (Academic and
International), Universiti Teknologi
Malaysia



"A One Stop Centre for Sustainable Energy Management"



*UTM: Universiti Teknologi Malaysia

Catalysing Transformation in Energy Sustainability via *UTM Living lab

Prof Ir Dr Zainuddin Abdul Manan, *CEng, CEM, REEM*
 Deputy Vice Chancellor, Academic & International
 Founding Dean, Faculty of Chemical and Energy Engineering
 Founder/Advisor/Consultant, to UTM Energy Management System
 Technical Advisor, Malaysia Green Technology Corporation
 Advisor, Economic Planning Unit for Sustainable Consumption and Production

- Certified 3 Star Energy-Efficient Facility
- Winner of ASEAN Energy Award 2012
- USD 7 Million Energy Savings (2011-2018)
- 10 Registered Electrical Energy Managers
- 50 Certified Energy Managers (CEMs)
- A Centre for Training Energy Managers
- Centre for Continuing Education in SEM
- Certified AEMAS/ISO 50001 Trainers/Auditors

Discussion