

Full Report - External

2021 SWITCH-Asia Leadership Academy on Technology for A Circular Economy



Date: 6-8 September 2021 (GMT +7 Bangkok Time)

Venue: Online by ZOOM

Disclaimer

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Table of Contents

List of Acronyms	3
Background	4
Objectives of the event.....	4
Logistical information about the event.....	4
Review on Participants	5
Summary of key messages	7
Session I: Opening and Introduction.....	7
Session 2: Introduction to Circular Economy and Technology - Linkages.....	9
Session 3: Technology for a Resource-efficient and Consumer-empowered Circular Economy.....	10
Session 4: Unlocking New Value for a Circular Economy: Circular Technology Applications and Case Studies.....	12
Group Project: Group discussion & PPT preparation.....	14
Supervisors:.....	14
Group 1.....	15
Group 2.....	15
Group 3.....	15
Group 4.....	16
Group 5.....	16
Group 6.....	16
Closing and Way Forward.....	17
Highlights of Discussion	18
Evaluation Results	18
Snapshots of the event	20
Annex:	22
Annex 1: The Final Agenda.....	22
Annex 2: Pre / Post Workshop Self-Assessment.....	24

List of Acronyms

CE	Circular Economy
COVID-19	Coronavirus Disease 2019
EU	The European Union
SCP	Sustainable Consumption and Production
SDGs	Sustainable Development Goals
FEW System	Food, Energy, Water Resources System
GHG	Greenhouse Gas
EIP	Eco-industrial park
SWITCH-Asia RPAC	SWITCH-Asia Regional Policy Advocacy Component
UN	United Nations
UNEP	United Nations Environment Programme
IESD	UNEP-Tongji Institute of Environment for sustainable Development
UOW	University of Wollongong, Australia

Background

The EU-funded SWITCH-Asia programme aims at promoting sustainable development which contributes the transition towards a low-carbon, resource-efficient and a more circular economy.

The Regional Policy Advocacy Component (RPAC) implemented by UNEP is responsible for organizing the Leadership Academy, a flagship activity of the SWITCH-Asia programme, working closely with selected young professionals from Asia to shift mindsets towards sustainable consumption and production practices. Previous academies were organised in 2018 in Bangkok and 2019 in China to introduce the fundamental concept of circular economy. In 2020, the Academy dived deep into how to communicate about the circular economy, showcasing case studies from both Asia and Europe. This year, SWITCH-Asia RPAC sees the need to touch base on technology and innovation. Technological advancements across sectors have catalysed circular business models, driving new processes, new communication channels and operational efficiencies that promote achievement of circular economy principles and approaches through enabling the decoupling of resource use from economic growth across industries.

Collaborating with Tongji University, SWITCH-Asia RPAC is organizing the 2021 Leadership Academy focusing on innovative technologies towards circular economy across young professionals in the region.

Objectives of the event

- To shift mindsets and inspire action on innovative green technologies towards circular economy among young professionals in Asia;
- To support learning about technologies and innovations contributing to Circular Economy across sectors and along the lifecycle of products and services, as well as to showcase innovative practices;
- To strengthen the network on circular economy for young professionals across Asia.

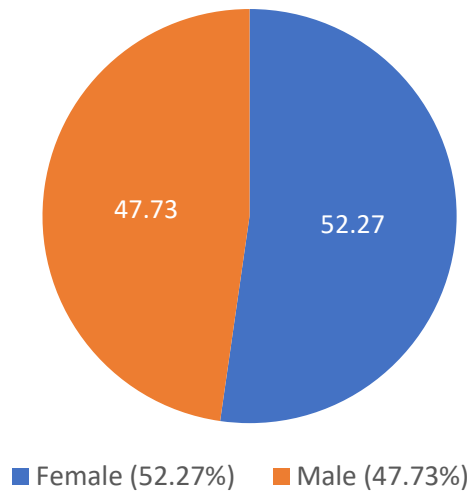
Logistical information about the event

The event was conducted online over three days via Zoom platform. The draft training manual on technology for circular economy, group work guidance materials with six group topics were prepared and shared with the successful candidates by email before event for reading. Presentations with group exercise, Q&A session, especially breakout group works with two experienced supervisors were arranged to make the three-day virtual training knowledge professional, interactive and interesting.

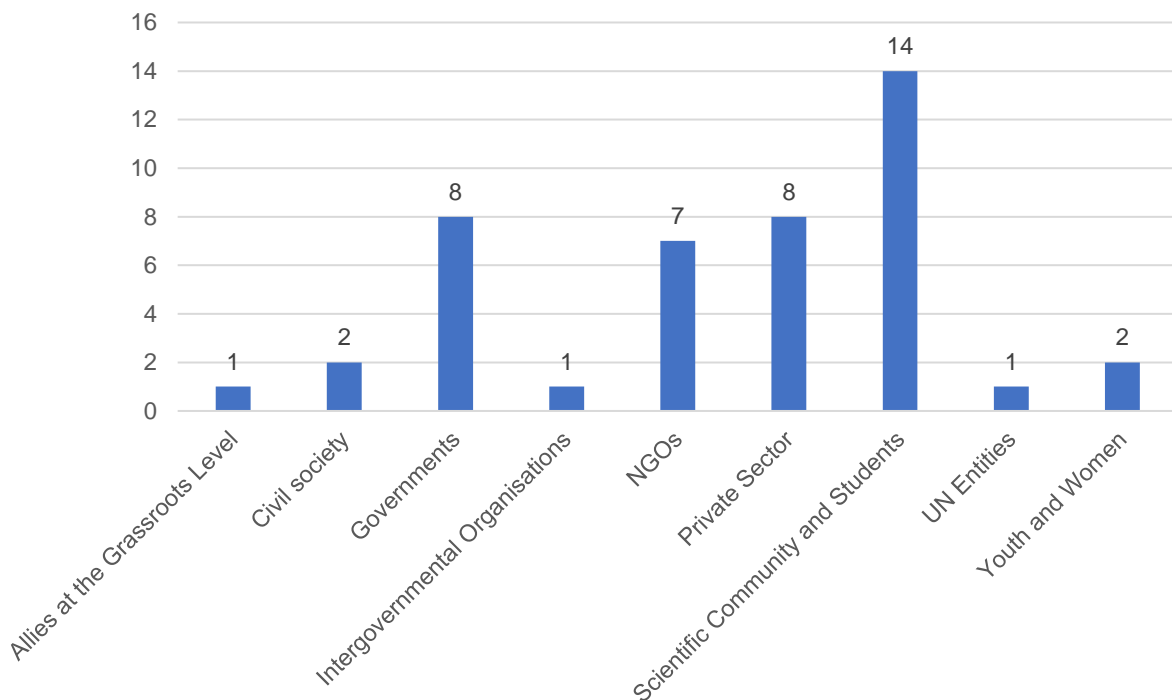
Review on Participants

51 candidates from 16 SWITCH-Asia countries were successfully selected out of 110 eligible applicants. 44 young professionals with different background finally completed the three-day virtual training programme, among which 52.27% were female and 47.73% were male. Figures below presents the distribution of participants by stakeholders and gender.

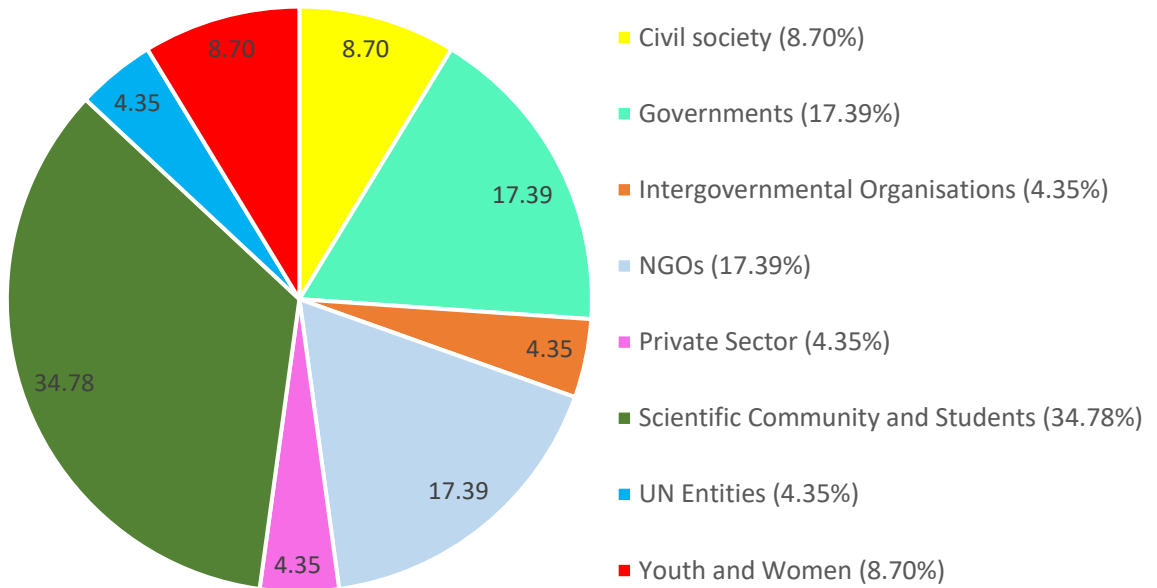
Participation by Gender (%)



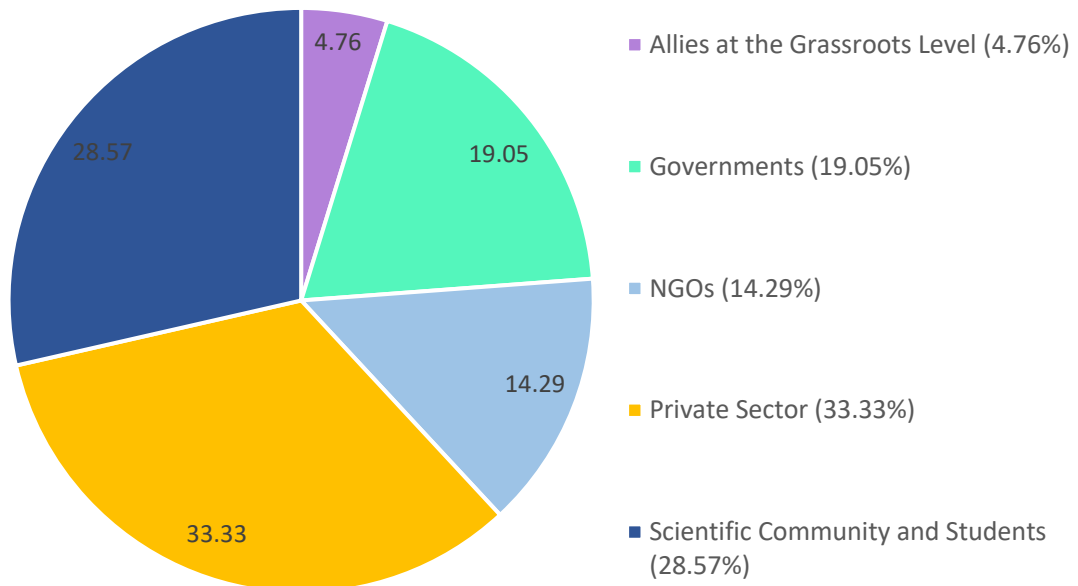
Participation by Stakeholders



Female Participation by Stakeholders



Male Participation by Stakeholders



Summary of key messages

Session I: Opening and Introduction

Welcome Remarks



Dr. Mushtaq Memon

Resource Efficiency Sub-programme Regional Coordinator, UNEP Regional Office for Asia and the Pacific Project Manager, EU SWITCH-Asia Regional Policy Advocacy Component (RPAC)

Dr. Memon congratulated all applicants on clearing the rigorous selection process, appreciated Tongji University for supporting and collaborating efforts and thanked the European Union for their generous support on SCP through the SWITCH-Asia Programme.



Prof. WU Jiang

Dean, UNEP-Tongji Institute of Environment for sustainable Development (IESD), Tongji University

On behalf of Tongji University, Prof. WU began the remarks by warmly welcoming all of the attendees coming to the EU SWITCH-Asia Leadership Academy and congratulating all the selected candidates for their outstanding applications. He indicated that as the world strives to reach top tier levels of technological advancements today, it is important to maintain sustainable practices so that future generations can also enjoy the resources we have today. He hoped that the learning will not stop with the academy and the networks created here today last a lifetime.

Opening Remarks



Mr. Saroj Srisai

Programme Officer, Delegation of European Union to Thailand

Mr. Srisai introduced the EU Switch-Asia programme and highlighted the European Green Deal strategy and all of its eight interlinked pillars leading Europe towards carbon neutrality by 2050. He highlighted the roles of technology for the transition to a circular economy, and stressed the importance on bilateral and regional cooperation through SWITCH-Asia programme in the field of sustainable consumption and production.

Self-introduction

Through the short self-introductions, the participants' projects were well known each other covering a wide range of topics, including food waste, textile products, architecture and etc. Although the participants have different backgrounds, they have showed strong interests in the circular economy and innovation in green technologies.

Background and Introduction of the 2021 Leadership Academy

Ms. Tunnie Srisakulchairak

Programme Management Officer, EU SWITCH-Asia RPAC

Ms. HOU Shuzhi, Tongji University

In order to give participants a more in-depth and comprehensive understanding of SWITCH-Asia Leadership Academy programme, Ms. Srisakulchairak gave a brief introduction through overviewing the previous leadership academies including a video made after the 2019 SWITCH-Asia Leadership Academy held in 2019, Beijing. The following 3-day agenda were briefly explained by Ms. Hou, Tongji University.

Session 2: Introduction to Circular Economy and Technology - Linkages

Introduction to A Circular Economy



Prof. WANG Tao

Associate Professor, College of Environmental Science and Engineering, Tongji University

Ms. FAN Chuan

Project Manager, Learning and Design, Ellen MacArthur Foundation



The introduction describes the essential features and benefits of a circular economy compared to a linear economy after completing this unit, how to use the UNEP's "9R" circularity framework to explain the concept of the circular economy, and how technology and innovation can contribute to each link in the circular economy. Prof. Wang also emphasized that the energy industry accounts for 45 percent of carbon emissions, while agriculture and other manufacturing industries account for 45 percent. Carbon emissions will be minimized if the Circular Economy is implemented in these industries.

The Role of Technology to A Circular Economy - Facing the Carbon Neutrality



Prof. Yadong Yu

Associate Professor, East China University of Science and Technology

During the presentation, Prof. Yu taught the term carbon neutrality comes from climate change, and what carbon neutrality refers to, and the definition of greenhouse gas (GHG) emissions, and emphasized that GHG must be offset by carbon sequestration to achieve net-zero emissions. Prof. Yu also said that a broad range of policy approaches and technologies are required to achieve rapid CO₂ emission reductions over the next 30 years in the net-zero emission (NZE) scenario. In the context of circular economy, technologies can improve the value retention of materials and products and reduce waste, and could promote the decoupling of economic growth from resource use.

Sustainability Framework of Technology



Dr. Mushtaq Memon

Resource Efficiency Sub-programme Regional Coordinator, UNEP Regional Office for Asia and the Pacific Project Manager, EU SWITCH-Asia Regional Policy Advocacy Component (RPAC)

Dr. Memon shared the sustainability framework of circular technology. He outlined the key features and benefits of a circular economy in comparison to a linear economy, explained the concept of the circular economy using UNEP's "9R" circularity framework, and how technology and innovation can play a role in each link of the circular economy after the sessions.

Session 3: Technology for a Resource-efficient and Consumer-empowered Circular Economy

Technologies for Circular Supply Chain and Consumer Behaviors



Prof. (Anthony) Shun Fung Chiu

University Fellow, De La Salle University, the Philippines

Prof. Chiu spoke on "Technology for a Resource-efficient Circular Economy" and "Technology for a Consumer-empowered Circular Economy" The two topics focused on the production and consumption of good which directly relates to the SDG12. He started by emphasizing that sustainable features heavily rely on decoupling principles. In general, the studies acknowledge that decoupling is a complex systems challenge worth studying if true sustainability is to be attained in the face of a growing demand for resources by an increasing population; the latter being one of the main reasons why effective decoupling mechanisms are needed.

He proceeded by using Japan as one example of the Asian country that established the Circular Economy Law. Japan passed the Basic Act on Establishing a Circular Society in 2000. This was a response to a slew of waste-related issues in the late 1990s. High trash generation, difficulty obtaining additional waste treatment facilities, and a rise in illicit dumping were among them. It's also a drive to encourage people to recycle even more. He further explained the various concepts in circular economy such the input-output principles, sustainable product innovation (SPIN), material flow accounting, cost benefit analysis etc. If current systems of production and provision for major services will not be

changed, nine billion people would require about 180 billion tonnes of materials annually by 2050, almost three times today's amounts.

Circular Design



Mr. Joe Iles

Circular Design Programme Lead, Ellen MacArthur Foundation

Mr. Joe first talked about what is circular design and why we need circular design. He detailedly introduced several successful cases to explain how to eliminate waste and packaging, and regenerate the natural system. Mr. Joe brought up the topic that circular design is the design for the circular economy, which contains three conceptual principle. He also emphasized that design is a powerful tool enable the circular economy at product, service and system levels, which only a good combination of product and service will make out a good outcome.

Case Study: Material Innovative to Reduce Single-use Plastics



Mr. Norapat Phaonimmongkol

Co-founder and CEO, Eden Agritech

Eden Agritech is a food tech startup company focusing on prolonging shelf-life of perishable food by edible and natural biotechnology. Mr. Phaonimmongkol explained the vision of Eden Agritech is to uplift the quality of life of every consumer by giving better access to fresher and cleaner food, while their mission is to become state-of-art food-tech company that deliver the best, maintain quality technology of fruit, vegetable and related consumable goods. He shared his experiences with the food technology on how to prolong the shelf-life of perishable food by edible and natural biotechnology.

Session 4: Unlocking New Value for a Circular Economy: Circular Technology Applications and Case Studies

Waste Management Technology to A Circular Economy



Prof. Muttucumaru Sivakumar

Associate Professor, University of Wollongong (UOW), Australia

Prof. Sivakumar gave a presentation on waste management technologies in the context of a circular economy, with a focus on sustainable water and waste water management. He discussed the notion of circular economy in relation to the SDGs and the water sector, as well as a renewable energy-based water treatment system, in his talk. He backed up his ideas with three case studies: the Illawara water treatment facility, the Wollongong water reclamation plant, and the SBRC waste-water management. He also talked about the potential for renewable energy in water and wastewater treatment.

He highlighted how waste water can be used to generate energy via a micro hydro, and how digested biomass can be used for agriculture. Food waste can also be used as agricultural manure. This idea is used to demonstrate the circular economy concept. He spoke on renewable energy-based water treatment technology, as well as the possibility of combining solar energy with desalination. According to studies given by him from Veolia, more people will be at high risk of water pollution in 2050 as BOD, Nitrogen, and Phosphorus levels rise.

He summed up his lectures by saying that renewable energy sources and a thorough life cycle analysis must underpin all treatment system design, decentralized nature-based systems like built wetlands are more sustainable, and waste water treatment systems can be designed to be carbon neutral. Waste water is a resource that can be recovered with the use of sustainable engineering techniques.

Water-energy Nexus in Wastewater Treatment and Management



Prof. WANG Hongtao

Associate Professor, College of Environmental Science and Engineering, Tongji University

Prof. WANG talked about the water-energy nexus in waste water treatment plants, drinking water treatment plants, and the residential sector, with instances analysis of the south-north water transfer project, and to demonstrate the amount of energy required to carry such a large amount of water, such as "Great Man-Made River Project" and the Yangtze Three Gorges Dam, the world's largest hydroelectric dam.

He explained the traditional water cycle, the resources in waste water, and the energy-water nexus in more detail. For example, how water is needed for energy extraction, processing, and transformation, as well as bioenergy irrigation, and how energy may be used to generate water. He demonstrated a conceptual model of energy-related water-sector processes, and how fresh water is used in the United States, the United Kingdom, India, and China by sector in the agricultural, industrial, and municipal sectors. He also demonstrated the difference between a carbon-neutral waste water treatment facility and an energy-efficient waste water treatment plant.

Food, Energy, Water Resources in Circular Economy and Their Nexus



Prof. LIANG Sai

Professor, Institute of Environmental and Ecological Engineering at Guangdong University of Technology.

Food, energy and water are the three basic substances on which human beings depend and are essential to the achievement of the Sustainable Development Goals. However, with the continuous development of social economy and the continuous increase of population, the global demand for these three resources is increasing, so all countries are faced with water shortage, food security, energy scarcity and other common problems. Prof. Liang introduced the integrated solutions for circular systems. To identify the direct and indirect effect of the nexus, a material and energy flow analysis should be taken into consideration by the researchers, which contains three steps, including modeling individual FEW systems, identifying interdependence of FEW systems, and constructing FEW networks.

Prof. Liang also introduced the environmentally extended multi-regional input-output model. Input-output analysis, as a method to study the structure of economic system and the interaction between industrial sectors, is widely used in environmental pressure accounting and other areas because of its own advantages. To wrap up, Prof. Liang emphasized several potential policies included in the training manual. For instance, he advised that adopting green fiscal measures to support circular business models through removing fiscal subsidies on fossil fuels and introducing market-based mechanism to put a price on carbon externalities.

Group Project: Group discussion & PPT preparation

Supervisors:



Prof. (Anthony) Shun Fung Chiu

University Fellow, De La Salle University, the Philippines



Dr. ZHANG Jing

Lecturer, Tongji University

Based on the online survey results of participants' priority and back up choices, they are divided into 6 groups focusing on different sub-topics below,

- Technology related challenges and opportunities in developing a circular economy to realize SDG targets
- Role of technology in the transition towards a circular economy in Asian cities
- Renewable energy technologies in developing countries in Asia
- Circular design and technologies supporting the development of eco-industrial Park (EIP)
- Technology solutions to reduce food waste
- Technologies for sustainable and circular tourism

During the first discussion session, participants mainly focused on sharing their own project background with each other to find out what could be the common gap for the whole group

project. Most of the groups showed strong interest on the difference between the conventional technology and innovative technology under the circumstance of circular economy.

For the second group discussion, the participants began to work together on their presentation through Zoom panel discussion group or Google slides. Through breakout group work, each group completed the group project and delivered a 10-minutes presentation together to share the main findings. Below are the topics and field of interests each group picked for their group project.

After the presentation of all 6 groups, Dr. Zhang and Prof. Anthony separately made a summary to the outcomes of the group project and thanked the participants for their dedication to the program throughout the three days. Overall, they both were very impressed with the group works and commended their efforts to do such detail within the short time notice.

Group 1

Topic: Solar system and water resource management related challenges and opportunities in developing a circular economy to realize SDG targets in Nepal.

Group Members: Prantor Kumar Mondal, Rebecca Gurung, Sujan Ghimire, Trang Thi Nguyen, Chitralada Chaiya, Chansovathdy Meas

Group 1 discussed the case study of solar system in SANIBHERI-8 in RUKUM WEST1, Nepal, opportunities of technology in circular economy and their challenges. The supervisor commented that the group should carefully look at the inter-linkage between the SDGs and their relationship to the circular economy concept.

Group 2

Topic: Smart technologies for establishing circular economy in the Asian cities.

Group Members: Abhishek Kanojia, Aprilia Rinasti, Sijia Yang, Ziwei Nie, Haslenda Hasim, Fen Li, Ugyen Tshomo, Hung Tran

Group 2 introduced the significance of circular economy in Asian cities, and scope the discussion from the technologies for circular economy in urban waste management, urban infra and urban farming. Dr. Zhang commented that no technology is entirely negative as they all work in a way that brings positive values to society.

Group 3

Topic: Renewable energy technologies rolling circular economy.

Group Members: HuiJing Deng, James Doldolia, Bunheng Ly, Xuejing Chen, Kanida Tang, Arjmand Amjad, Dan Li

Group 3 chose to present the hydrogen production and application overview in China, the energy efficiency, solar PV and sustainable biomass overview in Cambodia, the success stories of solar, wind and biomass technology practices in Pakistan, the case studies of solar PV and biomass in the Philippines. The supervisors commented that technologies are applied best depending on the country, hence there is generally no best technology but the country decides what suits them most depending on their climatic situation.

Group 4

Topic: Development of Eco-industrial park (EIP) – case studies

Group Members: Istiak Ahmed, Nadia Akhtar, Dulguun Battuya, Chanto Cheya, Rozaidi Mahat, Bae Pheaxay, Amelito Segarra, Ying Wang

Group 4 got to the point through talking about the concepts and fundamentals of eco-industrial parks (EIP), and shared case study 1: Kalundborg EIP in Denmark, and case study 2: Guitang Group EIP in China. Dr. Zhang commented the two cases of EIP separately, and shared some challenges currently to develop EIP.

Group 5

Topic: Circular economy technologies for food waste.

Group Members: Myat Han, Shiela Marie Villota, Andy Yang, Thet Swe, Anusha Karki, Tharindu Trishan Darshana Senarathna

Group 5 targeted the circular initiatives of food waste recycling, its key benefits and gave the real-life case studies and practices from Woolworths. Dr. Zhang suggested the group to think about how to make more investments in the food sector to avoid food waste and encourage high yield.

Group 6

Topic: Technologies for sustainable and circular tourism.

Group Members: Rohit Jha, Henry Beh, Novena Rena, Rasikh Habib, JiaMin Li, Khin Myat Soe

Group 6 started with introducing the UNWTO 2018 international tourism results, and related the tourism activities with the carbon footprint. Their presentation focused on the implication of circular economy in tourism including the production side opportunities and consumption side opportunities. Dr. Zhang explained to the team, how technology can affect tourism and suggested possible investment in the sector. For some countries that rely heavily on tourism, innovative technologies should be introduced.

At the very end of this session, Professor (Anthony) Chiu stated that was happy to see the quality of the work put in by the groups. He emphasized the system thinking concept. In response to one participant's call for more focus on the energy sector, Professor Chiu narrated how the UN gathered 40 scientists from across the world to study only energy for three years, and in the end, they developed 250 pages report. He mentioned that the UN has already put a measured effort into the energy sector. He equally talked about how ideas become obsolete shortly and the need for the participants to keep discovering new technologies that would bring sustainable development.

Closing and Way Forward



Prof. LI Fengting

Deputy Executive Dean,

UNEP-Tongji Institute of Environment for Sustainable Development, Tongji University

Prof. LI Fengting appreciated the EU SWITCH-Asia programme and highlighted the importance on training of Circular Economy and green economy for young professionals towards the achievement of Sustainable Development Goals (SDGs) in Asia.



Ms. Tunnie Srisakulchairak

Programme Management Officer, the EU SWITCH-Asia RPAC, UNEP Regional Office for Asia and the Pacific

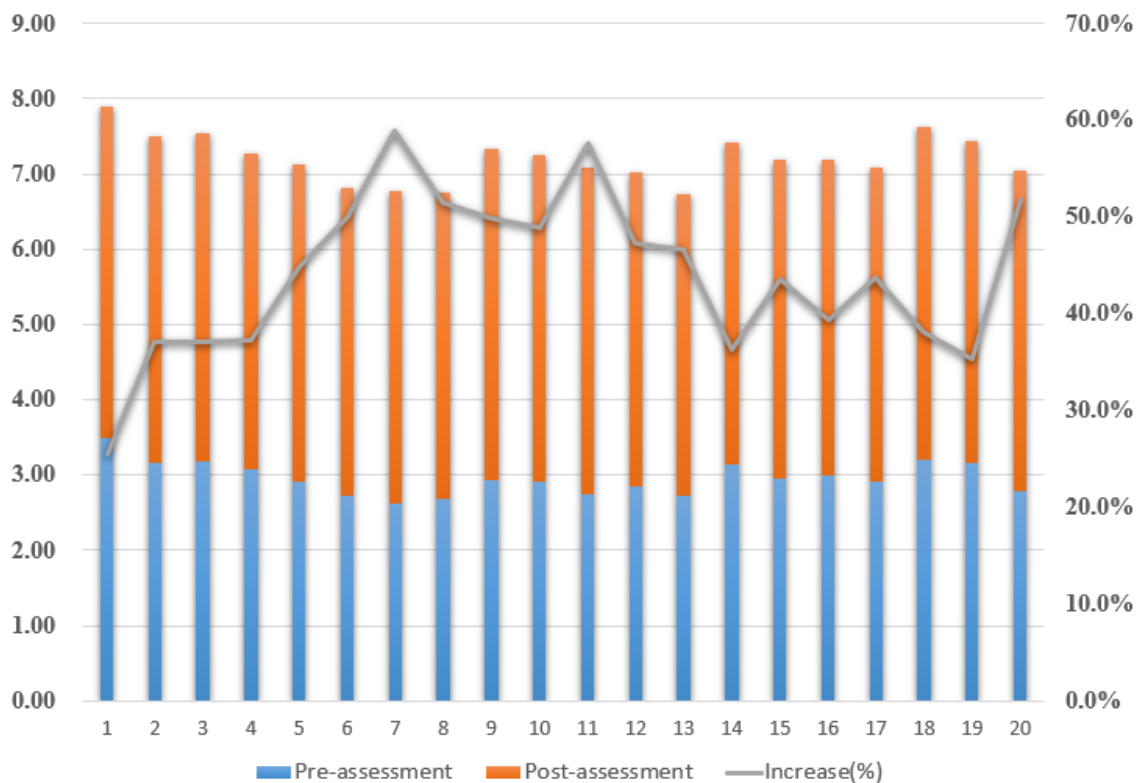
Ms. Tunnie summarized the topics discussed at the event and highly encouraged participants to be pioneers in their communities in demonstrating how circular economy can be applied and is beneficial to enhance sustainable development. She expressed EU SWITCH-Asia RPAC's appreciation to the EU, speakers and participants.

Highlights of Discussion

Based on the online survey results of participants' priority and back up choices conducted before the event, the participants are divided into 6 groups focusing on different sub-topics important and emerging in Asia during the leader academy, which covers technology related challenges and opportunities, role of technology, circular design and technology solutions for food sector, tourism and industrial parks.

Through the group discussions, most of the groups showed strong interest on the difference between the conventional technology and innovative technology under the circumstance of circular economy. Through breakout group work, each group completed the group project and delivered a 10-minutes presentation together to share the main findings very well. The two supervisors of the group discussions both were very impressed with the group works and commended their efforts to do such detail within the short time notice.

Evaluation Results



Learning Objectives	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Pre	3.50	3.16	3.18	3.07	2.91	2.73	2.61	2.68	2.93	2.91	2.75	3.50	3.16	3.18	3.07	2.91	2.73	2.61	2.68	2.93
Post	4.39	4.33	4.36	4.21	4.21	4.09	4.15	4.06	4.39	4.33	4.33	4.39	4.33	4.36	4.21	4.21	4.09	4.15	4.06	4.39
Increase (%)	25.5	37.2	37.1	37.3	44.8	50.0	58.8	51.4	49.9	49.0	57.6	25.5	37.2	37.1	37.3	44.8	50.0	58.8	51.4	49.9

Learning Objectives
1. Able to describe the theory of circular economy
2. Understand essential components of circular economy
3. Understand roles of technology to promote circular economy
4. Able to identify technologies for circular economy
5. Understand technologies for a resource-efficient circular economy
6. Able to identify technologies for circular supply chain
7. Understand technologies for a consumer-empowered circular economy
8. Able to identify technologies for consumer behaviors
9. Understand concept of circular design
10. Understand roles of circular design for circular economy
11. Able to identify circular design principles and strategies for circular economy
12. Able to identify potential sectors to mainstream technology for circular economy
13. Understand how to create effective coordination at national and local levels to improve technology for circular economy
14. Understand roles of material innovative to reduce single-use plastics
15. Able to identify material innovations to reduce single-use plastics
16. Understand systems of food, energy, water resources in circular economy and their nexus
17. Able to Identify strategies and technologies promoting Food, Energy, Water Resources in Circular Economy and Their Nexus
18. Understand waste management technology to circular economy
19. Able to identify waste management technologies to circular economy
20. Understand water-energy nexus in wastewater treatment and management

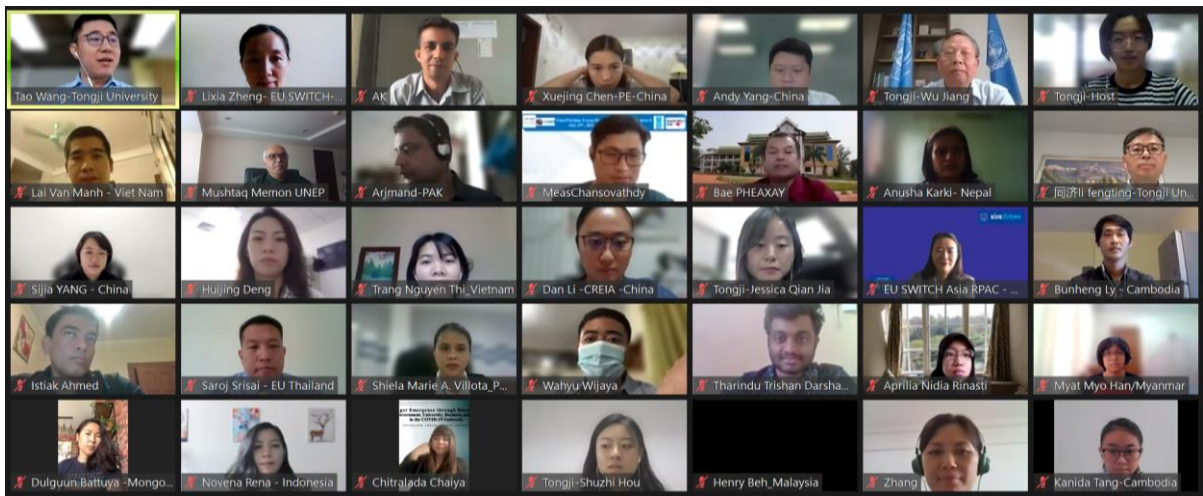
The evaluation was designed and conducted to provide an informal measurement on how this training can contribute to an increase in participant's knowledge, skills and/or competencies on different modules of circular economy during the 2020 SWITCH-Asia Leadership Academy. It was evaluated by using the scale from 1 (lowest) to 5 (highest) in relation to each learning objective before and after the training.

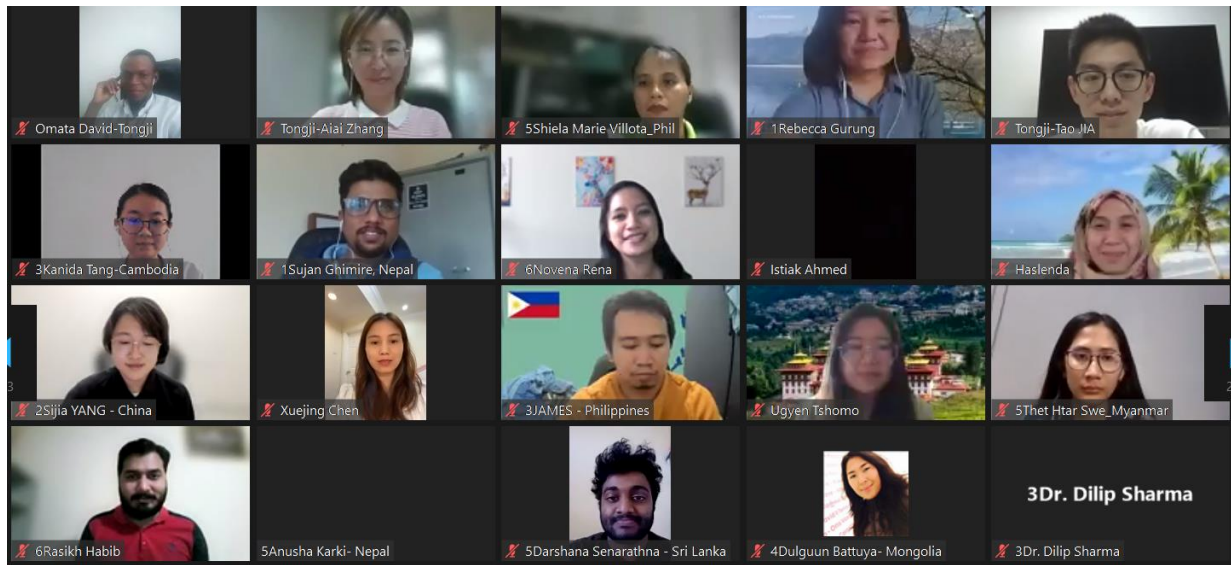
In the pre-evaluation, participants were observed to score the highest for (learning objective 1 & 18 & 19) able to describe the theory of circular economy, understand waste management technology, able to identify waste management technologies to circular economy. Comparatively, the participants scored comparatively lower on (learning objective 6 & 7 & 8), able to identify technologies for circular supply chain, understand technologies for a consumer-empowered circular economy and able to identify technologies for Consumer Behaviors.

The post-evaluation scores show significant increase in learning objectives 6-12, specifically learning objective 7 and 11, understand technologies for a consumer-empowered circular economy and able to identify circular design principles and strategies for circular economy, counting 58.8% and 57.6%. Learning objective 20, understand water-energy nexus in wastewater treatment and management also has a dramatic increase of 51.8% on the post-evaluation score.

All learning objectives shown in the graph stipulate good improvement of knowledge on Technology for A Circular Economy during the 2021 EU SWITCH-Asia Leadership Academy by the indicated percentage on how much improvement was done from pre- to post evaluation.

Snapshots of the event





Annex:

Annex 1: The Final Agenda

Day 1: Monday 6 September 2021

Facilitator: Prof. WANG Tao, Tongji University

Session 1: Opening and Introduction Session	
10:00-10:05	Welcome Remarks by EU SWITCH-Asia RPAC <i>Dr. Mushtaq Memon</i> Resource Efficiency Sub programme Regional Coordinator, UNEP Regional Office for Asia and the Pacific Project Manager, EU SWITCH-Asia Regional Policy Advocacy Component (RPAC)
10:05-10:15	Remarks by Tongji University <i>Prof. Jiang Wu</i> Dean of UNEP - Tongji Institute of Environment for sustainable Development (IESD), Tongji University
10:15-10:25	Opening Remarks <i>Mr. Saroj Srisai</i> Programme Officer, Cooperation Section, Delegation of European Union to Thailand
10:25-11:20	Group Photo and Self-introduction
11:20-11:30	Coffee Break
11:30-12:00	Background and Introduction of the 2021 Leadership Academy <i>Ms. Tunnie Srisakulchairak</i> Programme Management Officer EU SWITCH-Asia RPAC, UNEP Regional Office for Asia and the Pacific <i>Ms. Shuzhi HOU, Tongji University</i>
12:00-13:30	Lunch Break
Session 2: Introduction to Circular Economy and Technology - Linkages	
13:30-14:20	Introduction to A Circular Economy <i>Prof. Tao Wang, Tongji University</i> <i>Ms. Chuan Fan, Ellen MacArthur Foundation</i>
14:20-15:20	The Role of Technology to A Circular Economy - Facing the Carbon Neutrality <i>Prof. Yadong Yu, East China University of Science and Technology</i>
15:20-15:30	Coffee Break
15:30-16:00	Sustainability Framework of Technology <i>Dr. Mushtaq Memon, Resource Efficiency Sub programme Regional Coordinator, UNEP Regional Office for Asia and the Pacific</i> Project Manager, EU SWITCH-Asia RPAC

Day 2, Tuesday 7 September 2021

Facilitator: Ms. ZHENG Lixia, the EU SWITCH-Asia RPAC

Session 3 : Technology for a Resource-efficient and Consumer-empowered Circular Economy	
09:30-10:30	Technologies for Circular Supply Chain and Consumer Behaviors <i>Prof. (Anthony) Shun Fung Chiu, De La Salle University, the Philippines</i>
10:30-11:00	Case Study: Material Innovative to Reduce Single-use Plastics <i>Mr. Norapat Phaonimmongkol, CEO at Eden Agritech Co., Ltd.</i>
11:00-11:15	Coffee Break
11:15-12:00	Group Project Briefing <i>Prof. (Anthony) Shun Fung Chiu, De La Salle University, the Philippines</i> <i>Dr. Jing Zhang, Lecturer, Tongji University</i>
12:00-13:30	Lunch Break
13:30-14:00	Group Project: Group discussion & PPT preparation <i>Supervisor: Prof. (Anthony) Shun Fung Chiu, Dr. Jing Zhang</i>
14:00-15:00	Circular Design <i>Mr. Joe Iles, Circular Design Programme Lead, Ellen MacArthur Foundation</i>
15:00-17:00	Group Project: Group discussion & PPT preparation <i>Supervisor: Prof. (Anthony) Shun Fung Chiu, Dr. Jing Zhang</i>

Day 3, Wednesday 8 September 2021

Facilitator: Ms. Hou Shuzhi, Tongji University

Session 4: Unlocking New Value for a Circular Economy: Circular Technology Applications and Case Studies	
10:00–10:50	Waste Management Technology to A Circular Economy <i>Prof. Muttucumaru Sivakumar, University of Wollongong, Australia</i>
10:50-11:00	Coffee Break
11:00–12:00	Water-energy Nexus in Wastewater Treatment and Management <i>Prof. Hongtao Wang, Tongji University</i>
12:00-13:00	Lunch Break
13:00–14:00	Food, Energy, Water Resources in Circular Economy and Their Nexus <i>Prof. Sai Liang, Guangdong University of Technology</i>
14:00-14:30	Break
Session 5: Closing	
14:30–16:00	Group Presentation
16:00-16:10	Coffee Break
16:10-16:30	Comments & Feedback to the training
16:30–17:00	Summarization of the Group Project <i>Prof. (Anthony) Shun Fung Chiu, Dr. Jing Zhang</i> Conclusion and Closing Remarks <i>Ms. Tunnie Srisakulchairak, Programme Management Officer, EU SWITCH-Asia RPAC, UNEP Regional Office for Asia and the Pacific</i>

Annex 2: Pre / Post Workshop Self-Assessment

PRE / POST WORKSHOP SELF-ASSESSMENT

INSTRUCTIONS: This self-evaluation is designed to provide an informal measure on the extent to which the training has contributed to increasing your level of knowledge, skills, and attitudes. Based on your understanding at the end of the training, evaluate your level of knowledge/skills in relation to the learning objectives stated below after the training.

Learning objectives	Evaluate your level of knowledge/skills before the training				
	When 5 is the highest and 1 is the weakest				
	1	2	3	4	5
1. Able to describe the theory of Circular Economy					
2. Understand essential components of Circular Economy					
3. Understand roles of technology to promote Circular Economy					
4. Able to identify technologies for Circular Economy					
5. Understand technologies for a Resource-efficient Circular Economy					
6. Able to identify technologies for Circular Supply Chain					
7. Understand technologies for a Consumer-empowered Circular Economy					
8. Able to identify technologies for Consumer Behaviors					
9. Understand concept of circular design					
10. Understand roles of circular design for Circular Economy					
11. Able to identify circular design principles and strategies for Circular Economy					
12. Able to Identify potential sectors to mainstream technology for Circular Economy					
13. Understand how to create effective coordination at national and local levels to improve technology for Circular Economy					
14. Understand roles of Material Innovative to Reduce Single-use Plastics					
15. Able to identify Material Innovations to Reduce Single-use Plastics					
16. Understand systems of Food, Energy, Water Resources in Circular Economy and Their Nexus					
17. Able to Identify strategies and technologies promoting Food, Energy, Water Resources in Circular Economy and Their Nexus					
18. Understand Waste Management Technology to Circular Economy					
19. Able to identify Waste Management Technologies to Circular Economy					
20. Understand Water-energy Nexus in Wastewater Treatment and Management					

For more information

SWITCH-Asia event page:

URL: <https://www.switch-asia.eu/event/technology-for-circular-economy-a-prologue-to-the-2021-switch-asia-leadership-academy/>

Contact SWITCH-Asia Regional Policy Advocacy Funded by European Union
Implemented by United Nations Environment Programme, Asia and the Pacific Office

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