Co-funded by
the European Union

GreenEdAsia

Learning for a Sustainable Future
– Higher Education for Green Transition in Southeast Asia

Deliverable 2.1 Future scenarios in collaboration of green transition industry and education

11.11.2025

HCMUTE HAMK Häme University of Applied Sciences UNIVERSIDAD DE BURGOS

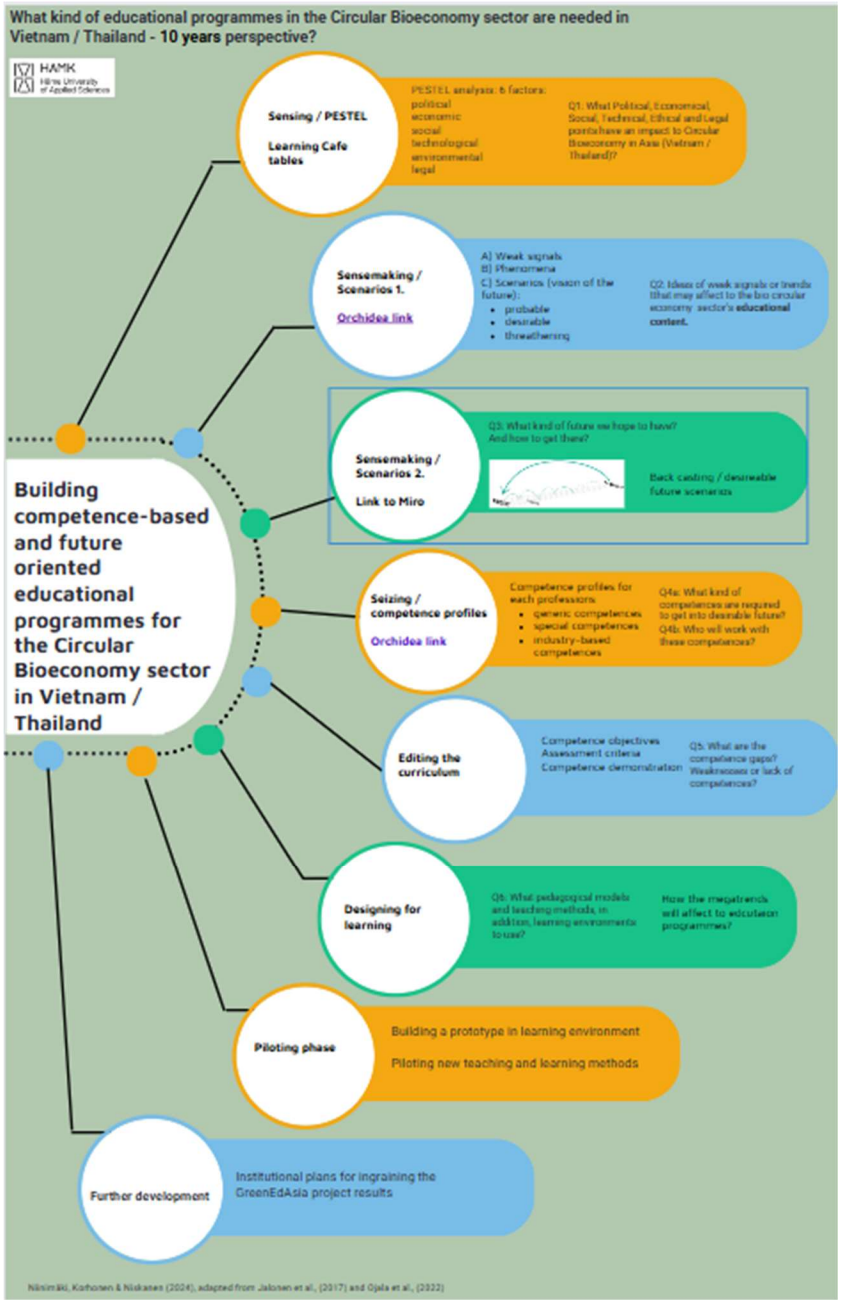
Learning for Sustainable Future – Higher Education for Green Transition in Southeast Asia - GreenEdAsia project has been co-funded by the European Union with the project ID 101177627. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or. Neither the European Union nor the granting authority can be held responsible for them.

Contents

1. Future foresight process

The process chart below shows the project flow. It starts with the PESTEL (Political, Economical, Social, Technical, Ethical and Legal) analysis that we made in the workshop held in Ho Chi Minh in February 2025. The question was asked: Q1: What Political, Economical, Social, Technical, Ethical and Legal points have an impact to Circular Bioeconomy in Asia (Vietnam / Thailand)? The mixed groups were organised. You can read the results in the next section. The workshop continued with the phase of the Week signals, and it was asked Q2: Ideas of week signals or trends tthat may affect to the bio circular economy sector's educational content. The weak signals were ideated with the Orchidea platform that gives room to think freely without thinking too much. There were lots of ideas but not so clearly related to the topic of the circular bioeconomy. That's why it was quite hard for participants to start writing the scenarios and design the process that leads us to the desired scenario with the backcasting method. However, the scenarios and backcasting process were created and they are presented in the chapter below.

The process then continued online and workshops were held in Zoom conferencing tool. The experts of the project then asked participants to make interviews with relevant persons from their educational institutions and the world of work, because it seemed that correct competences were not found from participants' presentations when we especially discuss about the Circular Bioeconomic, not just something related to green transition. The new areas of the circular bioeconomy as a new competence profile were found, and they are also described below. These findings are the industry requirements in partner countries in the field of circular bioeconomy. They are the end deliverables of this phase, 2.1 Future scenarios in collaboration of green transition industry and education.



https://infograph.venngage.com/pl/LtzJ6xnDBk4

2. Weak signals

The weak signals were ideated with the Orchidea platform that gives room to think freely without thinking too much. There were lots of ideas but not so clearly related to the topic of the circular bioeconomy. The next phase clarified a lot the circular bioeconomy related phenomenon when participants made the PESTEL analysis in small groups. Also, some workplace representatives participated to the workshop.

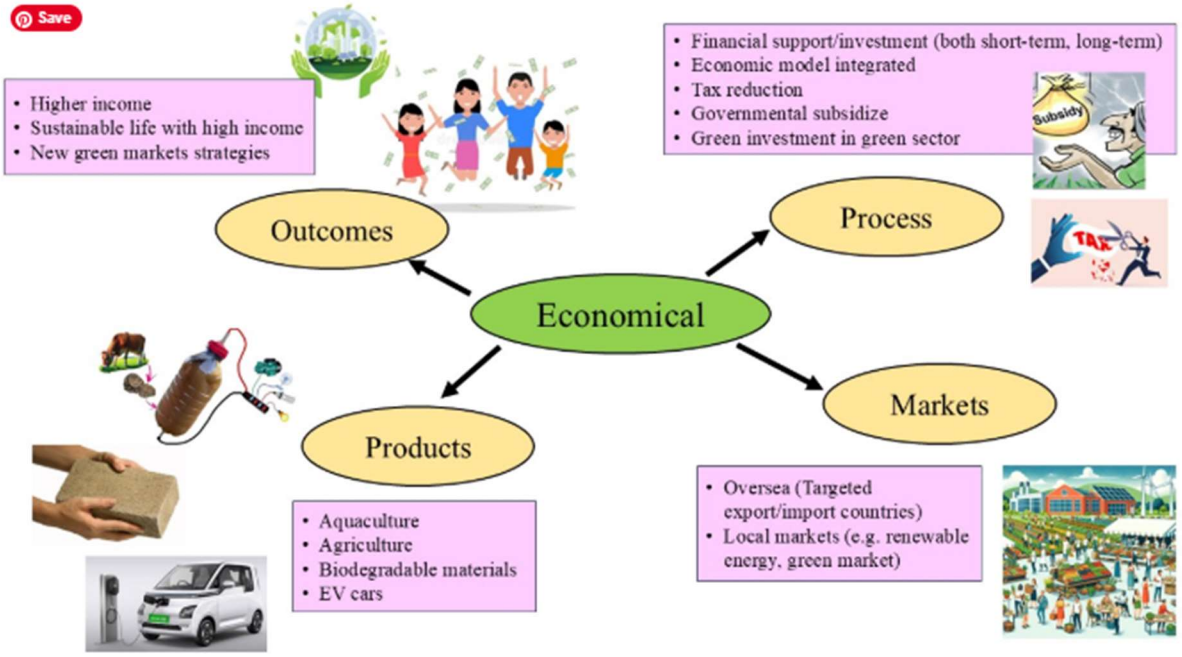
3. PESTEL analysis

The idea behind the PESTEL analysis is to consider all possible factors and aspects that might influence the problem-solving process regarding Political, Economic, Social, Technological, Environmental, and Legal viewpoints. The small groups began conducting the PESTEL analysis that was facilitated with the learning cafe method. The method collects all participants' opinions as everyone is contributing to every viewpoint. The PESTEL analysis results are collected below. They all are in different formats as groups wanted to present them.

3.1. Political

Politics plays a crucial role in shaping the circular bioeconomy (CBE) in Asia. Strong political support through clear regulations, green investment, and enforcement of sustainability policies can drive economic growth, job creation, pollution reduction, and resource efficiency. The success of the CBE depends on political commitment, regional cooperation, and sustainable policy implementation to create long-term economic and environmental resilience.

3.2. Economical

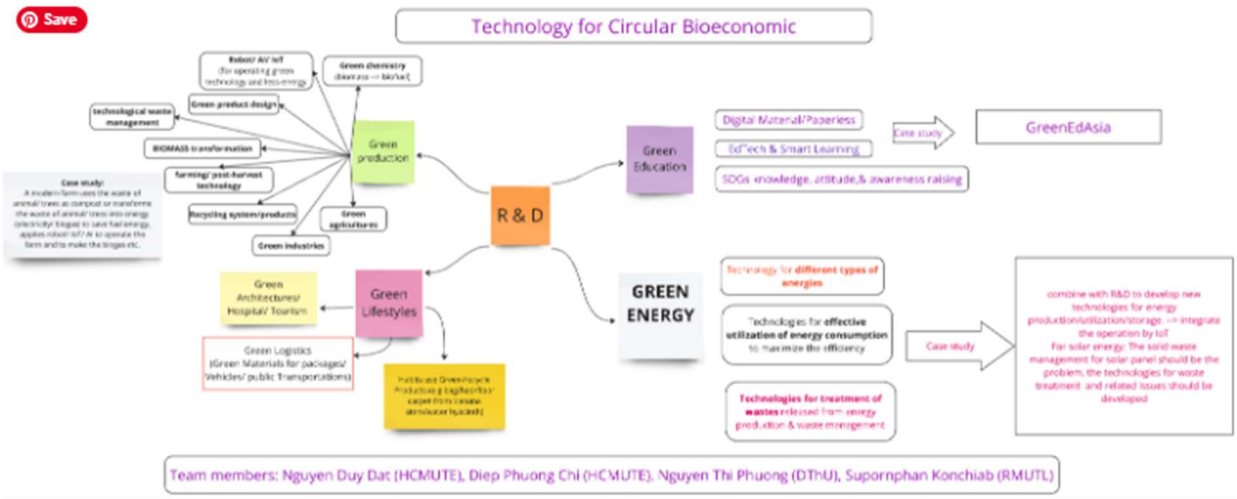


3.3. Social

The slide presentation: https://docs.google.com/presentation/d/1-aACY0kXYWUj-qylSknI40fUH5yPtiYXAuNAk3uRBeM/edit?slide=id.p1#slide=id.p1

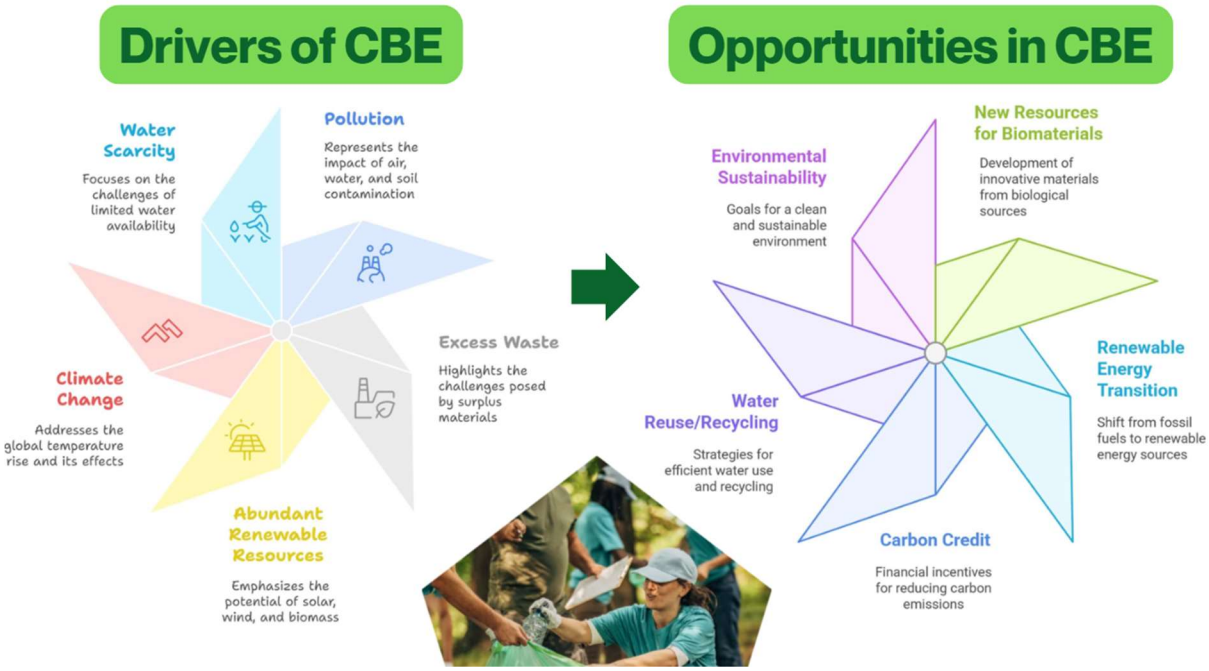
3.4. Technology

The diagram below describes our conclusions:



3.5. Environment

https://www.canva.com/design/DAGfmpUHHl8/YGlgLB0Dp8uTtk7Jf-9klg/edit?utm_content=DAGfmpUHHl8&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton



3.6. Legal

The discussion focuses on BCG (Bio-Circular-Green) Economy, highlighting key legal aspects related to renewable energy, circular bioeconomy, and green transition. The key points identified include:

Bioeconomy: Utilization of biological resources such as crops, palm oil, and waste oils for biofuels (ethanol, biodiesel).

Circular Economy: Policies encouraging recycling, sustainable waste management, and carbon/plastic credit laws to promote resource efficiency.

Green Economy: Support for environmental regulations, including CO_2 emission laws, energy efficiency in industries, and renewable energy subsidies.

Legal and Policy Frameworks: Emphasis on stricter environmental laws, tax incentives for sustainable business transitions, and international cooperation (MOU/MOA agreements).

Other Global Legal Policies Supporting Circular Bioeconomy & Green Transition can be included in this topic

1. European Union (EU) Green Deal & Circular Economy Action Plan

- Stricter CO_2 emission reduction targets (Fit for 55 package).

- Extended Producer Responsibility (EPR) laws for sustainable waste management.

- Bioeconomy Strategy promoting sustainable agriculture and bio-based products.

2. United States – Inflation Reduction Act (IRA) & Bipartisan Infrastructure Law

- Tax incentives for renewable energy investments (e.g., biofuels, green hydrogen).

- Support for carbon capture & storage (CCS) and sustainable aviation fuel (SAF).

- Incentives for EV production and sustainable industrial practices.

3. China – Circular Economy Promotion Law & 14th Five-Year Plan

- Policies promoting biodegradable plastics and waste recycling.

- Government support for biomass energy production.

- Carbon trading system to enforce emission reduction commitments.

4. ASEAN & Thailand's BCG Model

- Zero-Burn Agriculture Policies to reduce biomass burning.

- Promotion of bio-based industries (e.g., cassava-based ethanol).

- Investment in circular packaging & sustainable supply chains.

With our ideas and Global Legal Policies, we can conclude:

- Legally binding CO_2 reduction targets with penalties for non-compliance.

- Tax exemptions for companies adopting circular bioeconomy practices.

- Stronger enforcement of eco-design regulations to reduce waste generation.

- Support for international carbon credit trading mechanisms to incentivize green investment.

- Mandatory sustainability reporting for corporations to ensure transparency.

These legal frameworks and policies are crucial for transitioning towards a sustainable bio-circular-green economy, balancing economic growth with environmental protection.

4. Interviews deepening the first analysis (PESTEL)

Since the PESTEL analysis seemed not to bring enough perspective to the topic of Circular Bioeconomy, the groups were asked to search for more information by interviewing their colleagues and the representatives of the world of work, who work in this specific field of the Circular Bioeconomy. The list of questions was ideated together with all participants in the online session earlier, and they chose the relevant questions. Here are the question lists by organisations
https://docs.google.com/document/d/1UVZApfFkrG_wzuz5mEKbAphVXNeB7IL7PSvR-R536Aw/edit?tab=t.0

The instructions for the interview of colleagues in relevant discipline and profession in educational insitutions and in the world of work were given:

- Choose the questions for the interviews (you can find all questions you created in Moodle)
- Make the interviews
- Collect the answers (transcript, notes)
- Prepare to present the answers in the next online workshop 22 April 2025

In below of the questions, you will also find the presentations of each organisation regarding to the results of their interviews.

4.1. HCMUTE:

Opportunities for implementing a circular bioeconomy in agriculture-related companies in Vietnam

1.Have you heard about BCE?

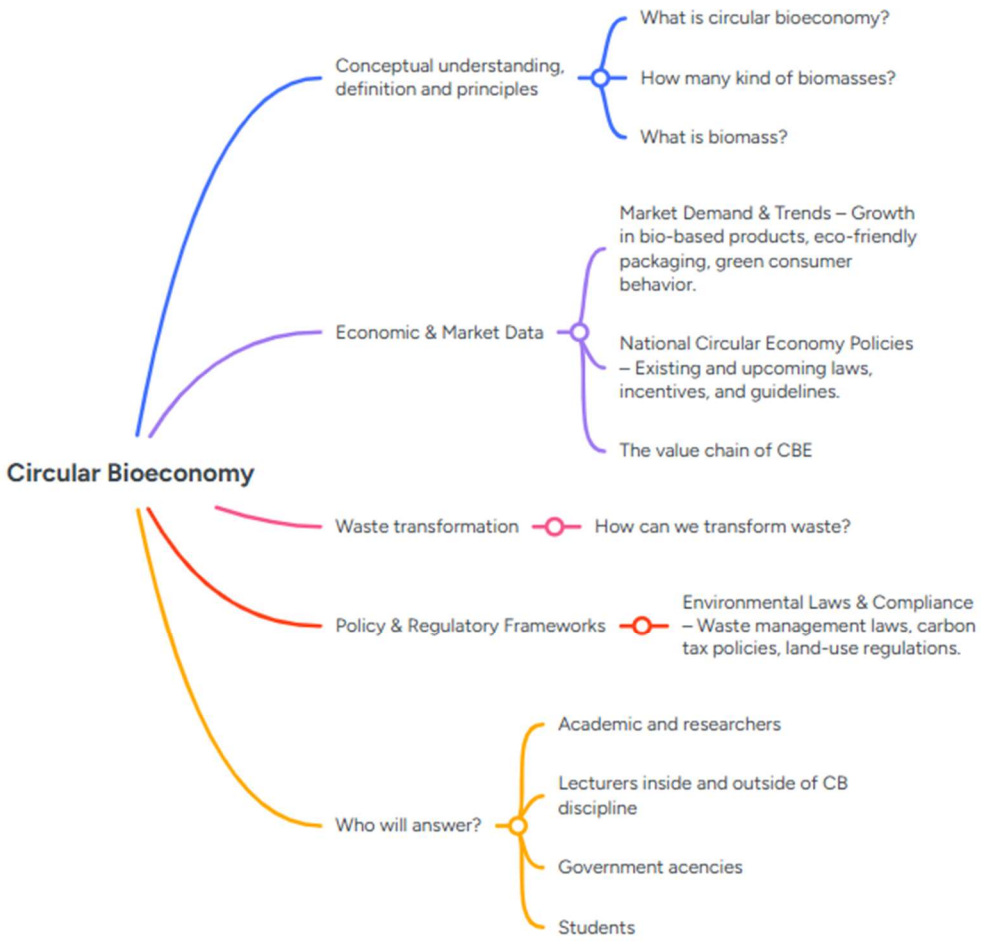
2.How do you re-use/recycle waste?

3.What kind of technology do you use to re-use/recycle that kinds of waste?

4.What do you expect about the effectiveness of these technologies?
5.What types of supports do you need in terms of techs or policies to implement BCO?

The presentation of the results:
https://docs.google.com/presentation/d/186mKz3OreNWTdAje5MDueVqWueMU5-QF/edit?slide=id.p1#slide=id.p1

4.2. DThU:



The presentation of the results DThU - Presentation on 22 April 2025 (1).pdf

4.3. RMUTL:

What kind of info do you need, regarding Circular Bioeconomy	Questions	Whom
1. General background	1. Which industries implement Circular Bioeconomy? 2. What motivate these industries to focus on Circular Bioeconomy?	Company
2. Specific information	1. What are the key attributes for promoting Circular Bioeconomy? 2. What are similarities and differences between CB and traditional approaches? 3. What are the most common technology advancements for CB?	Researchers Expert in Sustainability Environmental Economist/NGO
3. Policy and regulation	1. What are the focus of implementing CB (e.g., renewable energy, enhancing efficiency of energy consumptions)? 2. Why are these focuses? 3. What are the key policy and regulation that support these focuses? 4. Do you provide or think about incentive or campaign to promote CB?	Government/ UN
4. Education	1. What are the most important knowledge regarding CB that we want students to learn? 2. How do we deliver the CB knowledge (How to teach or promote such learning) 3. How can we implement CB concept to innovation research and development. 4. What are the most important attitudes students should have?	Colleagues/lecturers
5. Learning needs	1. What skills do you need to optimize yourself in the field of CB?	Students

The presentation of the results:
https://drive.google.com/file/d/11RqEb6fr9fZC2kP5j5YDuMxnPkRDBoF3/view

4.4. RMUTT:

1. What does the circular bioeconomy mean from your perspective?
2. What bio-based resources are available in your local area or community?
3. Does your enterprise, organization, neighborhood, or household generate any biomass? If so, what are the most common types?
4. How could these biomass materials be transformed into value-added products or processes?

The presentation of the results:
https://docs.google.com/presentation/d/12MhADtA2BzqnRcPeW5d7nDACFoNApQ6Q/edit

The results of the interviews were also presented by the project foresight expert to the managers in the visit week in UBU, in May 2025. You can find the conclusions of the all four interviews from this presentation: PESTE interview conclusions.pptx It is also concluded as follows:

All institutions made interviews with their stakeholders as follows:

- DThU: local government, experts, lecturers, business
- HCMute: enterprises, universities, colleges, research institutions
- RMUTT: social enterprise, service industry, government agency, education, community
- RMUTL: energy research and development institute, green venture capital company, a federation of industries, energy technology consultancy

The results were concluded and here you will see the list of the future requirements for new competences that interviews brought up regarding the field of the Circular Bioeconomy:

4.5. HCMUTE: enterprises, universities, colleges, research institutions

- Biomass energy and biofuel
- Organic fertilizer from coffee husks, manure
- Biogas from livestock waste
- Aquaculture water reuse
- Biodegradable packaging from starch
- Recycling agri/industrial by-products
- Biotech in waste treatment
- Green startups
- HR demands
- Biogas systems
- Biofuel from cassava
- Rooftop solar
- Microbial composting
- AI and IoT in agriculture
- Biomas
- Skills in biotech, digital tools, smart farming
- Strong soft skills: ethics, collaboration, adaptability
- ESG, sustainability policies, and regulatory frameworks

4.6. DThU: local government, experts, lecturers, business

- A change to use local resources better – turning waste into value
- Understanding a local policy
- Theory and practice
- Coordination between departments

- Specific technical skills such as composting, redworm farming, gasification
- Making circular farming right way
- Business skills
- Cost savings in the cultivation/production process
- Sustainable cultivation/production
- Reuse of byproducts and waste materials
- Consciousness of green practices in agriculture
- Reduce environmental pollution
- Mitigate climate change

4.7. RMUTT: social enterprise, service industry, government agency, education, community

- Bamboo - Charcoal – carbon credit
- Soil conditioner
- Organic waste – bio fertilizer
- Reuse of packing
- Plastic alternatives
- Solar panels
- Produce souvenier from the sea
- Gather aquatic weed (e.g. water hyacinth)
- Organic waste from malls
- Seaweed waste
- Input biochar production
- Cow poo & coconut husk waste turning into biofertilizer
- Vegetable garden staff
- Multifunctional use of agriculture, construction, carbon credit, monetization

4.8. RMUTL: energy research and development institute, green venture capital company, a federation of industries, energy technology consultancy

- Carbon footprint platform
- Waste transport
- Data infrastructure
- Tech and legal pathway: waste into value
- Waste types

- Profit farming
- Agri-tech
- Legal, laws, policies, regulations (bio-circular, green economy, CSR, Tax, CFO + CFP
- Biotechnology
- SAP software
- Sustainable energy technology
- Accessing funding
- Digital platforms for selling recycled products
- Cost efficiency
- Waste/wastewater biomass and sludge
- Agricultural waste
- Food waste
- Energy industries
- Bo-based materials
- Added-value products technology (e.g. cosmetic, pharmaceutical, biofuel, bioplast, fertilizer)
- Smart agriculture
- AI / IoT for efficiency monitoring
- Developing biomass
- EcoVadis
- Social impact
- Scaling BCG starups

5. Conclusions

The common thoughts from all groups were that there is a need for more workforce in the field of Circular Bioeconomy. Additionally, greater collaboration between education and industry is needed, which could help to solve the need for education that meets business and company needs. More innovative companies are also needed to solve these novel problems, and start-ups and new funding are requested.

The Competence gaps and competence profiles were found within this process even thought it took an extra interview round. At the end of this part of the process, the specific competence areas were identified that are now used in the next phase, when participants began drafting the new parts for the curriculum. The deliverable D2.2 Revised curriculum supporting competence-based education will present the new parts of the curricula of each organisation.