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1. EXECUTIVE SUMMARY

The current document is a proposal to complement the *Malaysia Circular Plastics Economy Roadmap 2020-2030*[1], which is expected to be finished in the first half of 2021. The aim of the blueprint is to support the Federal Government of Malaysia (mainly the Ministry of Environment and Water - KASA) and key stakeholders in developing concrete guidelines / programmes on circular economy for **cities**. The blueprint includes ideas to shape the current and post-Covid 19 future of cities for the transition towards circular economy.

It includes the **inputs** from three stakeholders' **consultations**, three concept notes for two **pilot projects** and one on **financing** circularity. It includes tools and recommendations to engage the public & private sector, academia/research and the civil society organisations into the entire cities transition process to circular economy. It also includes pathway(s) for the Malaysian cities to start **mainstreaming circular economy principles** into the cities' economic and urban development plans, taking into consideration EU challenges, solutions, best practices and models to be implemented in four phases for the Malaysian context.

The blueprint is proposed to be implemented in a **10-year** lifecycle using the below proposed **four-phases** approach:

Phases	Timeline	Action Taken
1	2021-2024	a) Proposing a Sustainable & Circular Product Policy Framework for Malaysia to complement Pathway 4 of the SCP Blueprint 2016-2030. b) Proposing a Malaysian Circular Cities Declaration by selecting top 5 major cities that have completed pilot projects before formulating the first Circular Economy Cluster in Malaysia. c) Financing Circularity e-guide and e-Hub completed.
2	2024-2026	a) Monitoring & Evaluation of post-pilot projects. b) Progress Reports with outcome indicators from city level implementers. c) Proposed recommendations for replication by other cities.
3	2026-2028	a) Five (5) key circular value chains presented that supports the work in Phase 1 and 2 for adoption which addressed the top five (5) common challenges Malaysian cities are facing in their transition towards circular economy, namely (1) Food, organic waste & water security; (2) Plastic pollution and packaging (in particular single use plastics); (3) Construction material flow and design (including demolition waste); (4) Household e-waste & hazardous waste; and (5) Lack of digital sharing tools & platforms as enabler for circular cities.

[1] This blueprint will also complement the *Malaysia Roadmap Towards Zero Single Use Plastics 2018-2030* and the *Malaysia's Marine Litter Roadmap 2020-2030* (to be launched in 2021).

4	2028-2030	An Implementation Report of the Roadmap to be prepared and published.

Table 1: Timeline of Blueprint

To secure a sustainable future, the completion of the four phases above must contribute to a **profound transformation of all parts of society** where Malaysian cities must commit to action built upon **five core systemic changes**. These are:

1. Transformation of the current local infrastructure and systems
2. Local development beyond competition and growth
3. Cooperation, inclusion and solidarity
4. A lifestyle and culture of sufficiency and optimisation
5. Re-orientation towards the common good of all citizens

The blueprint is designed to be agile and to be updated over time, focusing on **practical actions and continuous systemic change** in addition to assessing the actions implemented on the ground. The development phases will be **monitored** and updated during the process. Productive implementation of the blueprint will require active and diverse **communications** amongst all stakeholders to ensure all parties do not work in silos.

2. METHODOLOGY AND PROCESS

Prior to the submission of this Blueprint, the IUC Asia project team has conducted and completed the following:

a) Approached the Mayors and/or Directors (State Level) of two Malaysian cities / states to address and identify the cities' top 5 major challenges. In order to ensure **pragmatic implementation that is replicable in other cities** in Malaysia, preliminary initiatives were discussed with two Malaysian cities or states familiar with the IUC project. The cities that were selected this round were Penang and Petaling Jaya due to already ongoing circular economy initiatives underway[2].

b) **Three (3) online stakeholder consultations** including the engagement of public and private sectors, academia/researchers and civil society organisations took place on 29 June, 2 July and 19 August where stocktaking

[2] Seberang Perai City Council's Circular Economy Roadmap that covers 8 sectors (waste disposal site, recycling industry, food waste, reusable plastic, construction waste, electronic waste, renewable energy followed by water & sewage management) to increase resource usage efficiency in an effort to prevent wastage and protect the environment will be launched in December 2020. Petaling Jaya City Council's Circular Economy Roadmap – Petaling Jaya Food Waste Strategic Initiatives which includes a Pilot Study on Surplus Food Redirection which was supposed to be launched at the Petaling Jaya Waste Summit in November 2020 but postponed to 2021 due to Government of Malaysia's latest Covid-19 SOP as a result of significant rise of infections.

was carried out and inputs were collated. The consultations included European experts who shared challenges and solutions from European cities, including the private sector. In total **300+ EU & Malaysian stakeholders** were involved in this process.

c) **Two (2) concept notes** for **two (2) pilot projects** based on EU experience while taking into consideration the interests and external conditions of stakeholders mentioned above was submitted by end of September. The proposed pilot projects involve European cities working in Petaling Jaya (**digital innovation hub**) cities attached as **Annex 1** and Penang (**circular plastics**) attached as **Annex 2**. It also included potential business opportunities for European private sector. The **third concept note submitted in October** included information about access to possible financing sources via a **Financing Circularity e-guide** and a **National Circular Action e-Hub** where the IUC Asia project team has also liaised with European experts in charge of Malaysian cities' gap fund concept notes attached as **Annex 3**.

3. CITY-TO-CITY COLLABORATION ON CIRCULAR ECONOMY TRANSITION IN MALAYSIA

The IUC Asia project team is working with Malaysian experts & stakeholders to jointly and in **bilateral efforts** to continue with Circular Economy efforts in Malaysia where European and Malaysian cities embark on city-to-city cooperation in **three key areas**:

a) Research & Innovation;
b) Knowledge Transfer of Best Practices; and
c) Exploring Investments and Business Opportunities

This ongoing cooperation in these areas will be promoted locally when it comes to designing circular cities with current sustainable developments and advocating sustainable, environmental and climate-friendly solutions. Malaysian experts and stakeholders will work with the European Commission, its Member States and other partners to achieve more recycling, improved waste management, resource & energy efficiency, strengthen the bio-economies, create novel solutions in product design & new business models and most importantly the creation of green jobs.

3.1 Phase 1 – Concept Development: Malaysian Circular Cities

In essence, this blueprint hopes to complement Malaysia's existing various Roadmaps[3]which are currently underway. It is instrumental in providing continued bilateral technical assistance to facilitate and scale the transition of Malaysia's circular cities, one city at a time. The **primary goal for Malaysia** is that each circular city embeds the principles of a circular economy across all its functions, establishing an urban system that is regenerative, accessible and abundant by design. Malaysian cities will also aim to continue to eliminate the concept of waste, keep assets at their highest value at all times, and are enabled by digital technology. The end game would be to **generate prosperity, increase liveability, and improve resilience for the city and its citizens while aiming to decouple the creation of value from the consumption of finite resources**.

3.1.1 Phase 1a: Proposing a Sustainable & Circular Product Policy Framework for Malaysia

In Malaysia, there is no published comprehensive set of requirements/standards available to guide local producers to ensure that all products placed in the current Malaysian market become increasingly sustainable, stand the test of circularity as to realise Pathway 4: Towards a Circular Economy Waste System inside the Sustainable Consumption and Production (SCP) Blueprint 2016-2030 and expedite its implementation process. The **proposed guidelines** below will complement the said Pathway 4 of the Blueprint by ensuring that mechanisms are embedded in the processes which guide local producers to achieve more with less resources, waste and emissions by embedding clear circularity solutions to strengthen the business case for their industries and provide the best deal for their consumers.

As the SCP Blueprint focuses on increasing productivity through efficient use of resources and on value for money through savings and quality, the proposed circularity guidelines below can support the government's national plans. Clearer step-by-step guidelines will address the Pathway 4 of the SCP Blueprint more effectively and will also complement other upcoming Roadmaps like the Circular Plastics Roadmap 2020-2030.

This proposal inspired by the European Union guidelines is to assist Malaysian government to communicate effectively with the public through regulations, economic signals, education and information that includes viable circular solutions with specific circular models to facilitate faster adoption by local producers. The combination of such measures will deliver a more comprehensive and interlinked

[3] Malaysia Roadmap Towards Zero Single Use Plastics 2018-2030, Malaysia's Circular Economy Roadmap 2020-2030 (to be launched in 2021) and Malaysia's Marine Litter Roadmap 2020-2030 (to be launched in 2021).

framework to gain more through less. It will also propel Malaysia and its sectors to both a sustainable and circular future, be part of the game changer towards green growth and creation of green jobs in cities.

For local producers in various sectors to help the Malaysian Government meet their national development contributions (NDCs) and country targets for a climate-neutral, resource-efficient and part of the country's circular economy, it is important that the step-by-step requirements/standards on how to reduce waste gives them the confidence to progress towards increase sustainability and circularity. Therefore, the IUC Asia project team proposes that this sustainable and circular product policy legislative initiative should be prepared to complement Pathway 4 above and after the Malaysian Plastics Circular Economy Roadmap is launched.

This said sustainable and circular product policy legislative which was inspired by the EU's best practices and recommendations in the Circular Economy Action Plan[4] should not be interpreted as a duplication of the SCP Blueprint but a vehicle to expedite and strengthen its implementation timeline by getting local producers to jump on board faster.

This would also be timely and a good opportunity to create a Malaysian version of an Ecodesign framework[5] drawing from applicable examples extracted from the EU's Ecodesign Directive[6]. A local framework for local producers should be proposed for the broadest possible range of products that enables them to deliver on circularity.

Some guidelines below could help kick-start the process with key stakeholders and though non-exhaustive a few are highlighted below:

a) Improving product durability, reusability, upgradability and reparability, addressing the presence of hazardous chemicals in products and increasing their energy and resource efficiency;
b) Increasing recycled content (set targets in percentages with realistic timelines) in products by ensuring performance and safety of those products;
c) Enabling remanufacturing and high-quality recycling;

[4] European Commission (2020), "Circular Economy Action Plan – For a Cleaner and More Competitive Europe" [online]. Available at https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf (Accessed on 8 October 2020).

[5] European Commission, "Sustainable Product Policy & Eco-Design" [online]. Available at https://ec.europa.eu/growth/industry/sustainability/product-policy-and-ecodesign_en (Accessed on 8 October 2020).

[6] EUR Lex Access to European Union Law, "Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products" [online]. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0125 (Accessed on 8 October 2020)

d) Reducing carbon and environmental footprints;
e) Restricting single-use and countering premature obsolescence;
f) Incentivising product-as-a-service, water-as-a-service or other models where producers keep the ownership of the product or the responsibility for its performance throughout its lifecycle;
g) Enabling circular solutions with digital technology on both product information and data collection related to waste streams where projects are entitled for Green Technology Finance Scheme (GTFS);and
h) Incentivising or rewarding producers whose products are based on their different sustainability performance by linking high performance levels to The MyHijau[7] incentives which should include and benefit circular practices in production patterns.

3.1.2 Phase 1b: Proposing a Malaysian Circular Cities Declaration

The National Declaration provides a **common national vision of a circular city** that helps ensure cities act as a collective force in the transition to a circular economy in Malaysia. Signatories of the Declaration (city councils, private sector, NGOs, academia, civil society organisations) are committed to act as urban implementers for a circular economy that is low-carbon, beneficial to society, and decoupled from the consumption of finite resources. It recognises the need for **dedicated will power** and the **role cities play in accelerating the transition** to a circular economy in Malaysia.

The purpose of having a National Declaration offers several benefits to cities who already have an existing Circular Economy Roadmap to take that lead and to inspire others to craft one as well. The Malaysian signatories will become part of a **powerful, unified group** that will help raise awareness for the **long-term business, societal, and environmental, benefits of the circular economy**, and contribute to the development of a **supportive governance framework** which also promotes gender-responsive, inclusive and equitable action in realising the transition process, following a human rights-based approach and addressing the rights and needs of disadvantaged groups most vulnerable to the impacts of pollution due to a lack of circular economy solutions. In doing so, these cities will have the opportunity to collaborate with like-minded local governments and gain access to the implementation support of EU & local expert organisations via the city-to-city collaboration mentioned above.

[7] Malaysian Green Technology and Climate Change Centre (MGCC) (2019), "Guidelines for Green Technology Tax Incentive GITA/GITE" [online]. Available at https://www.myhijau.my/wp-content/uploads/2019/05/Guidelines-for-Green-Technology-Tax-Incentive-Rev.1-March-2019.pdf (Accessed on 8 October 2020).

The development process of the said Declaration should include a broad group of local organisations working with research centres (academia & think tanks) comprising of **promoters/ambassadors, facilitators and enablers** committed to enabling the transition to a circular economy at the local level to come up with a governance framework where local organisations are guided on how to measure outputs & outcomes, learn from challenges and share local best practices[8].

[8] For more information, visit: www.circularcitiesdeclaration.eu

3.1.3 Phase 1c: Proposing a Concept for Financing Circular Economy for Cities

To ensure that this ecosystem will thrive for the long-term, the **concept note** is proposing for Malaysia:

a) To establish a **National Circular Action e-Hub** to facilitate this entire process based on some European examples and best practices. The hub can be a catalyst for unlocking opportunities and support the two (2) **pilot projects in Penang and Petaling Jaya** that have been proposed by the IUC project in September 2020. This would facilitate the national roll-out of other circular economy / city projects.

b) It will also layout some **proposals** needed to **establish synergies** with **national institutions**, including the Malaysian Green Technology & Climate Change Centre (MGTC). Moreover, the concept notes aim to explore cooperation with the Green Technology Finance Scheme (GTFS) to provide additional financial tools, thus **boosting** the circular economy and sustainable smart city initiatives in Malaysia from 2021 onwards.

As a result of (A) and (B), Malaysian cities will be **enabled to shift** towards a circular model to increase their medium- to long-term competitiveness, becoming more appealing to financial institutions in terms of funding and financial support, while creating a **positive impact** within local communities. Further details of the **Concept Note** can be seen in ***Annex A***.

4. PHASE 2: KEY STEPS & TIMELINE

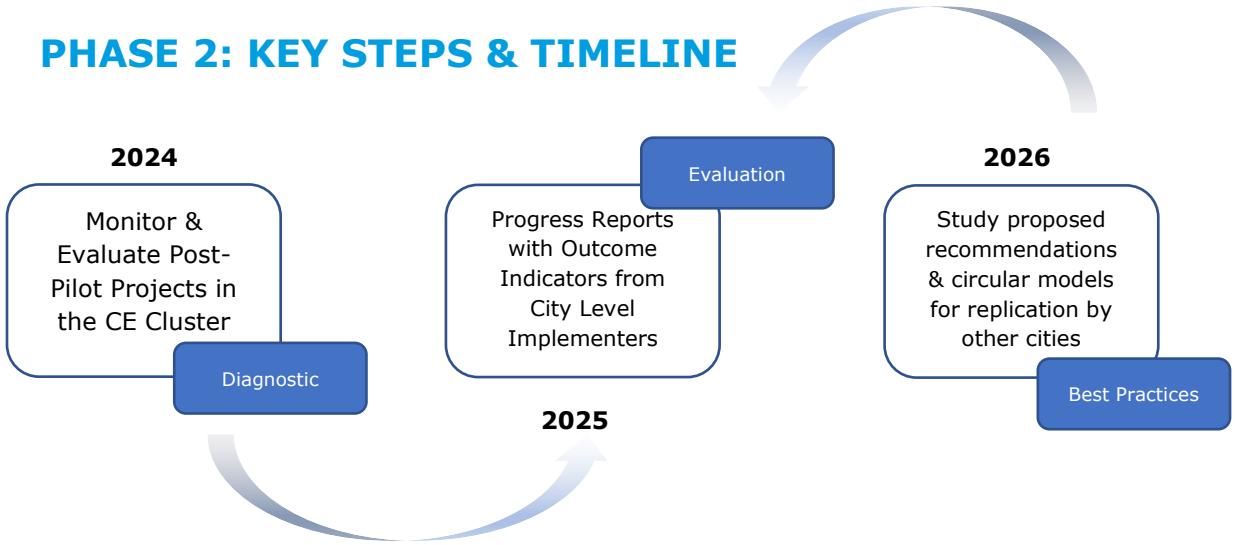


Figure 1: Phase 2 of Blueprint

The pilot projects act as circular city labs for experimentation, transformational change and innovation. A **national monitoring and evaluation** is key post-completion of the pilot project to run a thorough **diagnostic** to better understand the conditions for circular economy to happen. At the **evaluation stage**, it provides auditors and assessors to better understand how we can **set-up practical incentives** in order to **complement the policy framework**, provide for the necessary robust infrastructure to enable the key players to thrive in the ecosystem and creative ways to **catalyse funds**. This is because cities can help uncover the relevant roles and responsibilities in key sectors to drive the circular economy including areas where solving challenges at source are key to address citizens' concern on housing, waste and water.

The **final stage** is collating best practices of circular solutions that provides an opportunity for cities to do more with less, to better use the urban space and the available natural resources, and to transform waste into new resources, to bring social benefits, promote new forms of employment to create job opportunities and tackle inequality. This is imperative because cities have the bottom-up **entrepreneurial impetus and the closest links to citizens** to make this happen and generate the expected social, environmental and economic benefits of such innovations and pilot-test experimentations.

5. PHASE 3: TOP FIVE KEY CIRCULAR VALUE CHAINS TO FOCUS FOR MALAYSIAN CITIES

5.1 Circular City Apps for Circular Resource Management

EU-Malaysia stakeholders during the consultations, recognised that digital technology has the potential to identify the challenges of material flows in cities, outline the key areas of targeted waste streams, and formulate more effective decision-making in providing **systemic solutions**. It also ensures that cities who adopt the said technology will have security of data and systems.

EU experts demonstrated on the 29 June stakeholder consultation, that Malaysian city experts can benefit from the know-how on conducting a Circular City Scan, to identify the most significant, tangible progress in realising a circular economy and how it can be achieved. This prototype tool (closed beta programme) is available for interested parties and Malaysian cities' urban planners should apply to join.

With digital enablers like the Circular City Scan, it will enable local governments to discover and **prioritise circular opportunities** for their local cities based on proprietary and publicly available **material flow data**, relevant **circular case studies**, **users' inputs** as to which **sector materials** and **impact areas** are a priority for local agendas. It will also facilitate circular economy action plans for Mayors and City Councils to **reduce mistakes throughout the implementation plan**.

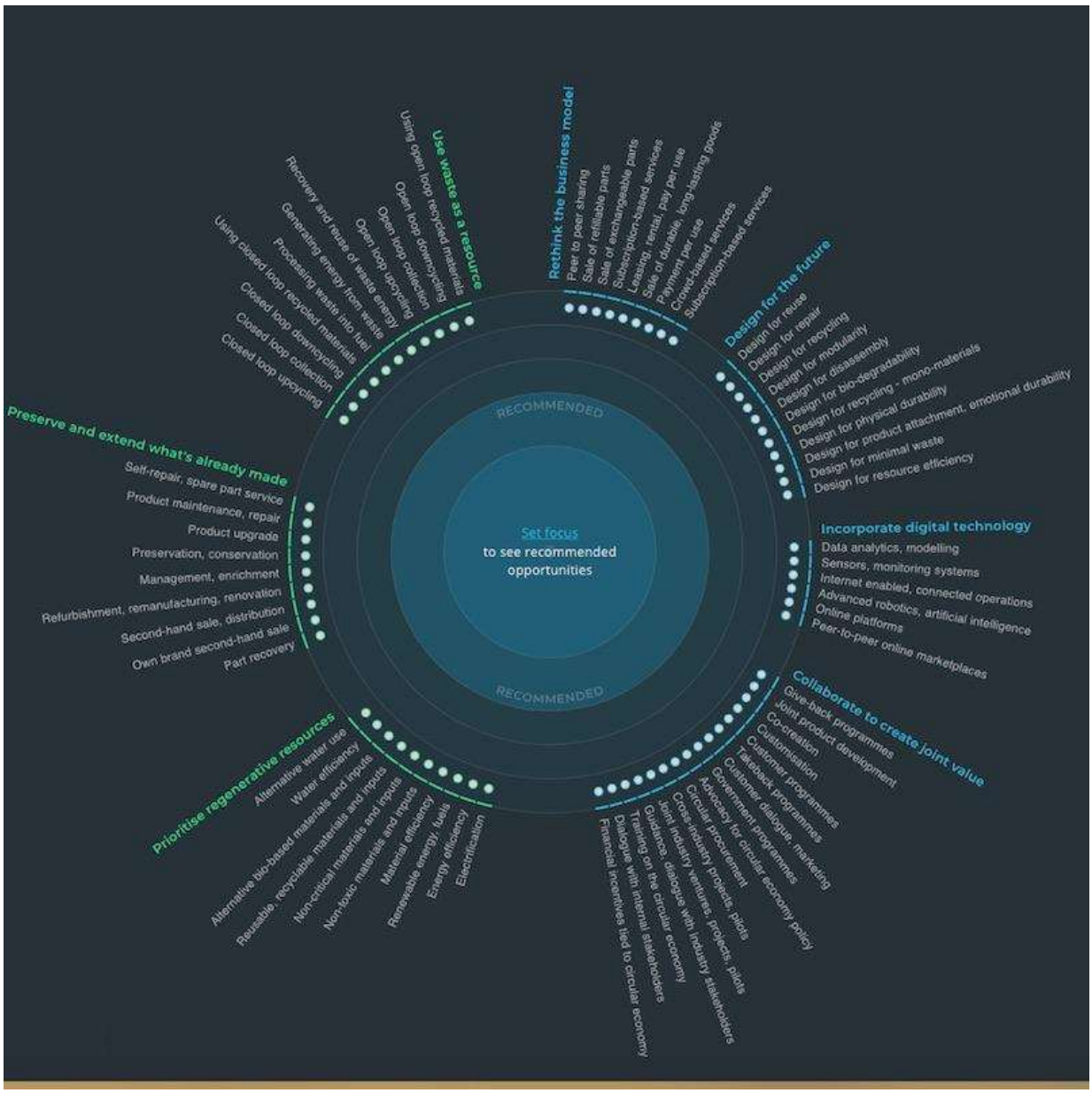


Figure 2: Inside the Circular City Scan

Local city monitoring programs and action plans can serve to accomplish the same objectives of the Circular City Scan. The added value to the Circle Economy's Tool, is that it is a fully developed digital tool that streamlines guidance for city officials. It can demonstrate how the **city's value chains can be altered to stimulate innovation, business opportunities, and job creation** in both established and newly created sectors.

The tool was developed in collaboration with organizations at the forefront of the circularity transition in their cities, in Switzerland, Finland, Czech Republic, Ghana, US, Canada, and Spain. The first city that has used it was Amsterdam. The country project reported details of the city's system processes and identifies the construction and organic waste chains as potential drivers of the transition to

circularity and long-term effects each will have on Amsterdam's current linear economy. Findings included the following:

Added Value of the project: The *implementation of material re-use strategies* has the potential to create a value of €85 million per year within the construction sector and €150 million per year with more efficient organic residual streams.
Material Savings: The *material savings* could add up to nearly 900 thousand tons per year, a significant amount compared to the current annual import of 3.9 million tonnes currently utilized by the region.
Job Creation: *Increased productivity levels* have the ability to add 700 additional jobs in the building sector and 1200 additional jobs in the agriculture and food processing industry.

European experts are now welcoming local governments, circularity consultants, project developers and circular solution providers in Malaysia to join their closed beta program and help co-create the future of the tool. The Petaling Jaya Pilot Project was designed to work in this area. The designated PJ Smart City Team, their local collaborators can explore working with EU experts on how to **create this Circular City App for circular resource management**.

5.2 Plastics and Packaging including Single Use Plastics

In a 2019, a study was commissioned by WWF Malaysia. It was reported that Malaysia recorded the highest annual per capita plastic use, at 16.78 kg per person compared to China, Indonesia, Philippines, Thailand and Vietnam. In terms of plastic waste, Malaysia ranks the second highest in overall generated waste. The study concluded that the recycling rate of post-consumption plastic packaging among Malaysians is still relatively low[9].

To address the need for a proper plastic waste management system, WWF released a report entitled **"Study on EPR Scheme Assessment for Packaging Waste in Malaysia"** in September 2020. It is a customised EPR scheme towards addressing Malaysia's plastic waste pollution. In the report, WWF identifies the Extended Producer Responsibility (EPR) scheme as a critical and effective policy tool in holding manufacturers accountable for the end-of-life impacts of their plastic products and packaging. EPR as a policy instrument also encourages adoption of **holistic eco-design among the business sector**.

[9] Please see the press release at https://wwfmy.awsassets.panda.org/downloads/press_release_launch_of_epr_my_report.pdf

Prior to the launch of the EPR Scheme above, the Mayor of Seberang Perai City Council, Penang already shared their framework of the Circular Economy Roadmap on 2 July stakeholder consultation (**see Figure 3 below**). The EU experts also shared important elements from the [European Strategy for Plastics in a Circular Economy] on how Europe is transitioning into a new plastics economy, where the **design and production of plastics and plastic products** will adopt **reuse, repair and recycling needs** where **more sustainable materials are developed and promoted.**

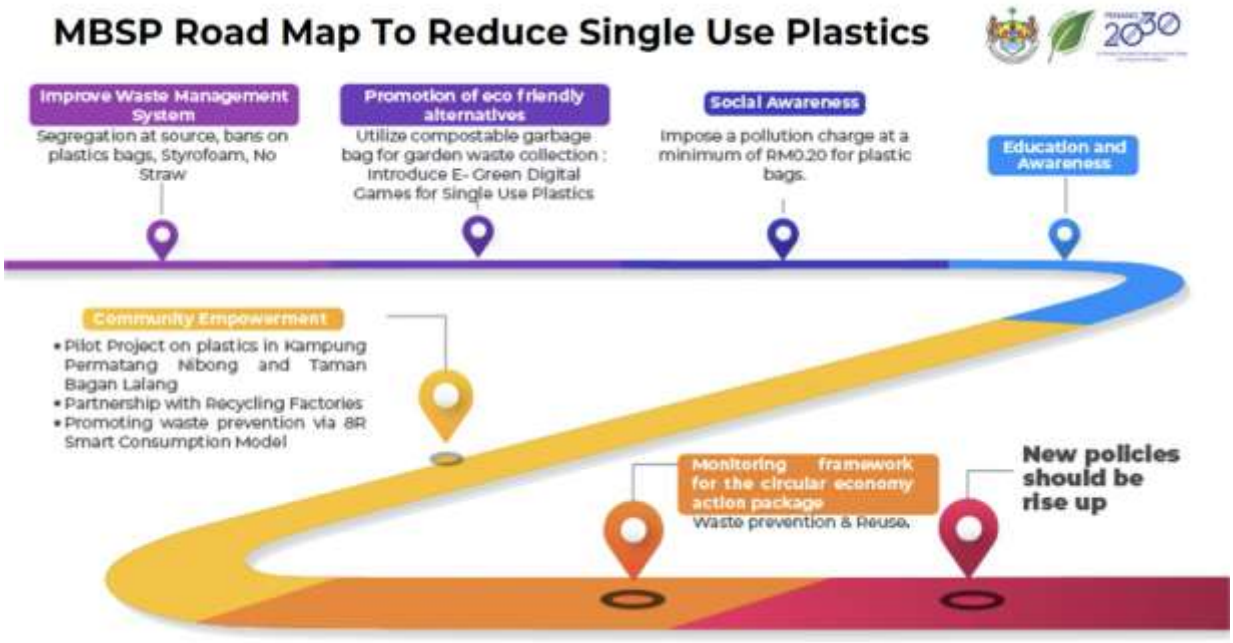


Figure 3A: Focus Areas of Seberang Perai City's Circular Economy Roadmap

Figure 3B: Petaling Jaya City Council's Circular Economy Roadmap

After the launch of Malaysia's Circular Economy Roadmap for Plastics 2020-2030, Malaysian cities should start crafting their **local city's circular roadmap** like Seberang Perai City Council and Petaling Jaya City Council as well. The below is an example on how they can draw inspiration from **Greater Manchester Combined Authority** on how they crafted four key objectives during their planning stage of their **Public Sector Plastic Pact**. Each Malaysian city could also determine their focus objectives as well.

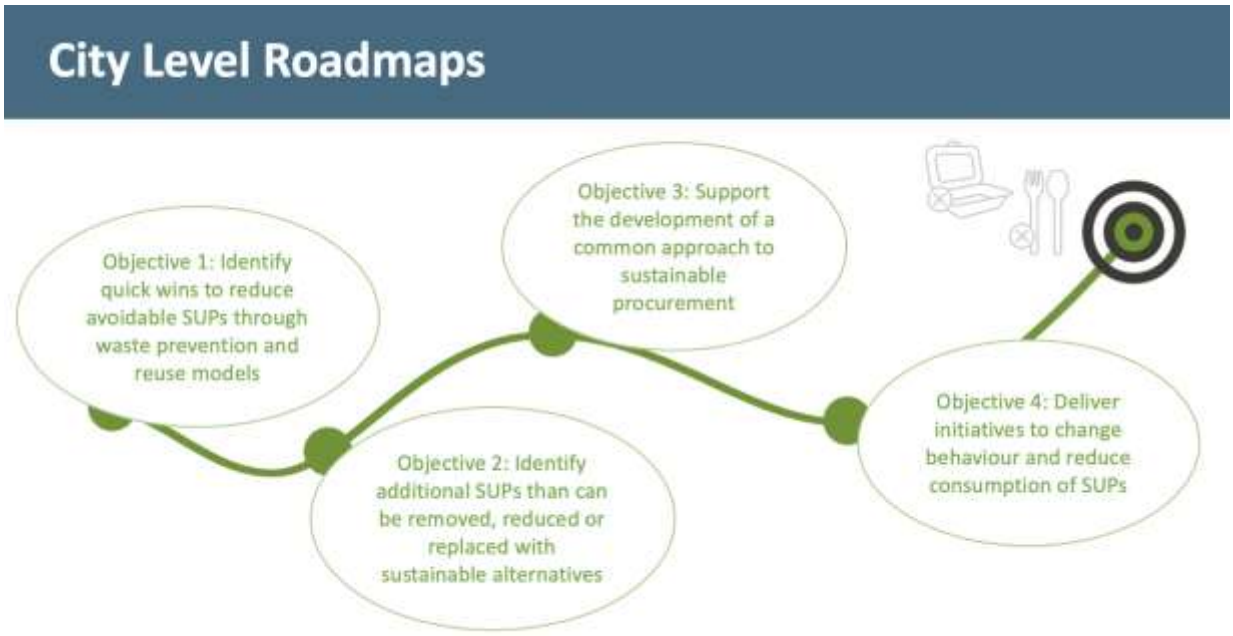


Figure 4: Input from EU experts on objective of City Level Roadmaps

Thereafter, to come up with a practical **4-step Action Plan** below to implement the local city circular economy roadmaps which contributes to the national targets as stated inside the Malaysia Circular Economy Roadmap 2020-2030.

Figure 5: Input from EU experts on Action Plan post City Level Roadmaps

5.3 Food waste & water security

Circular Economy: Benefits and Good Practices of Food Waste

Malaysia has a couple of local champion technology providers in composting food waste to fertilisers for edible gardens & urban farming/permaculture farms. Such local initiatives can be further scaled by expanding solutions which are not technology driven and more community centric driven in collaboration with the private sector food retailers and universities without the need of government grants. Inspired by the **Metropolitan City of Bologna**, Malaysia should consider creating its own **National Charter against Food Waste** to be implemented at city levels by all city councils.

Figure 5: Bologna Charter Against Food Waste

Acting on the national charter which further strengthens the **Malaysian Circular Cities Declaration** mentioned above, private sector retailers with universities should be roped in as signatories to step-up and create a local version of the **Last Minute Market (LMM)**[10] in a **dedicated section inside existing supermarkets** to be held weekly and as popular as the Malaysia's *pasar malam* (night markets) as well as **online via their websites**. The objective is to inculcate **ZERO WASTE BEHAVIOURS:** all services offered by LMM are studied and designed to **prevent and reduce losses and wastage**. LMM was created to assist companies in recovering surplus food, turning waste into a resource. Now LMM's fields of activity have expanded to different types of goods (e.g., medicines and non-food), and thanks to the package of services ever more innovative, LMM handles 360° waste prevention.

The services offered are:

- **recovery** of surpluses (food, meals, medicines, books, non-food goods, etc.)
- **data analysis,** loss and waste analysis, estimating the environmental and social impacts
- **training** for schools, companies and institutions
- **communication,** marketing projects and content production.

[10] It is a **social enterprise**, Spin Off of the **University of Bologna**, founded in **1998** as a research initiative. Today, it is an entrepreneurial society working at Italian national level, developing local projects aimed at the recovery of unsold goods (marketable or not) in favour of non-profit organizations. LMM favours the creation of a solidarity network in the area and the contact between demand (non-profit institutions) and offer (businesses).

It is crucial to study this phenomenon, with dedicated researches and studies in order to **identify the causes and possible solutions**, all along the **production and distribution chain up the final consumer**. LMM has been a win-win project, with benefits for the different stakeholders as well as for the environment in European cities like Bologna and Copenhagen. Malaysia can adapt and create a local circular solution model that fits well to our local environment.

Results achieved in European markets: Since 1998, Last Minute Market has been carrying out **waste recovery services for large-scale retail trade**. Thanks to networking with 350 stores and over 400 third sector entities, LMM currently recovers 55 thousand cooked meals, food products worth € 5.5 million, drugs for € 1,000,000 and more than 1000 tons of non-food products. The same can be said about Denmark's Surplus Food Supermarket Chain **WeFood**[11] which was started by a charity and has reduced the amount of food waste by 25% in the last 5 years (a reduction of roughly 35 pounds/16 kgs per person per year) since it started in 2016. Malaysian charities together with current supermarket chains like AEON, Giant, Tesco, Jaya Grocer and the likes, could be roped in as signatories of the national charter and partner together for a win-win outcome.

Circular Economy Systems for Water Systems

Malaysian **cities experiencing floods** and illegal dumping in rivers has affected **city's water supply contaminated** and incapable of meeting the needs of citizens. The government is forced to adapt their water cycles because the cost of inaction is very high. Hence, it is vital for the government to decide which elements of the water cycle are not sustainable and which ones need to be adapted to become more sustainable.

During an engagement session with the Secretary General of the Ministry of Environment & Water during the IGEM 2020 Water Webinars, Dato' Sri Zaini Ujang shared that there are three (3) sectoral issues and challenges that has given rise to a study to be conducted in Malaysia on development of a Roadmap for the transformation of The National Water Sector 2040.

Insufficient Raw Water Resources

- Situation worsened when drought was prolonged
- Malacca on 29 January 2020 implemented scheduled water supply involving 250,000 user accounts caused by the drought phenomenon

[11] The first 'unloved food' supermarket in Copenhagen, selling only items that are expired, mislabelled, damaged, or otherwise destined for the trash bin.

Pollution of Water Sources

- The problem of lack of raw water will be exacerbated if pollution of existing water resources which often occurs in several states in Selangor, Johor, Malacca and Pahang persists
- Examples: High concentration of ammonia from the garbage disposal sites, uncontrolled agricultural activities and widespread exploration of agricultural areas: solvents from car workshops

Low Reserve Margin

- There have been longer water supply disruptions resulting in various shutdowns of water supply for maintenance work and caused delays in the implementation of new development projects in some areas.
- Example: Gebeng Industrial Areas where the Semambu Water Treatment Plant (WTP) with a 4% reserve margin is having problems to meet the increasing demand for water supply especially from foreign investors.

The **City Blueprint®** is a good reference and practical communicative tool that can help Malaysian cities on their path to become sustainable water-wise cities.

Before designing a **Water Circular Value Chain for Malaysian cities**, this blueprint proposes to study the application of the City Blueprint® Approach. It is a diagnosis tool consisting of three complementary frameworks. The main challenges of cities are assessed with the **Trends and Pressures Framework (TPF)**. How cities are managing their water cycle is done with the **City Blueprint® Framework (CBF)**. Where cities can improve their water governance via the **Governance Capacity Framework (GCF)**. The GCF is a new framework and has been applied in 15 cities, including Amsterdam, Quito (Ecuador), Melbourne, New York City, Seoul, Cape Town, Bandung (Indonesia) and Ahmedabad (India).

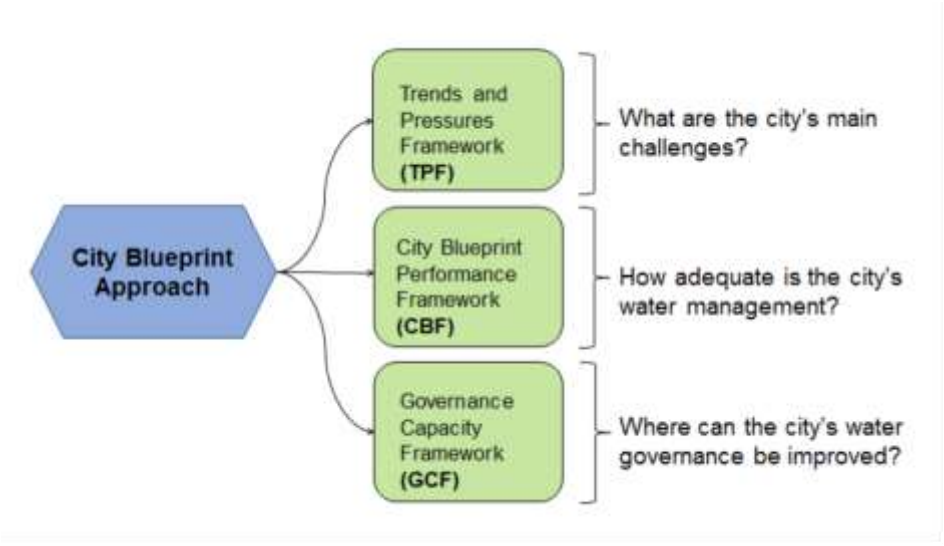


Figure 6: Three complementary frameworks of City Blueprint®

The benefits of proposing this application

- It reveals at a glance precisely where a **city's strong and weak points lie** and can serve as the key first step in **strategic long-term planning** to realize **cities to be sustainable and water-wise**.
- It is an easy to understand interactive tool serving strategic decisions. The actual assessment is done together with key stakeholders ensuring **usable results and quick access to expert knowledge**.
- It offers a platform that enhances **city-to-city learning, exchange of best practices**. Cities can learn important practical lessons from other cities that have already implemented best practices.
- The platform is expanding with at present, **75 cities in 40 different countries.**

With the above carried out, Malaysian cities can **apply circular economy principles** to **improve the water systems management in Malaysia**.

Circular Economy Principles *(Ellen MacArthur Foundation)*	Water Systems Management
Principle 1: **Design out waste externalities**	• Optimise the amount of energy, minerals, and chemicals use in operation of water systems in concert with other systems. • Optimise consumptive use of water within sub-basin in relation adjacent sub-basins (e.g. use in agriculture or evaporative cooling) • Use measures or solutions which deliver the same outcome without using water
Principle 2: **Keep Resources in Use**	• Optimise resource yields (water use & reuse, energy, minerals, and chemicals) within water systems. • Optimise energy or resource extraction from the water system and maximise their reuse. • Optimise value generated in the interfaces of water system with other systems.
Principle 3: **Regenerate Natural Capital**	• Maximise environmental flows by reducing consumptive and non-consumptive uses of water. • Preserve and enhance the natural capital (e.g. river restoration, pollution prevention, quality of effluent, etc.) • Ensure minimum disruption to natural water systems from human interactions and use.

Table 2: Application of circular economy principles to water systems management

The below is an example of a **Circular Economy Systems Diagram** published by Ellen MacArthur Foundation **specific to Water System** which can be adapted to fit the Malaysian context by implementing one to two pilot projects to create Malaysia's own **water circular value chain**.

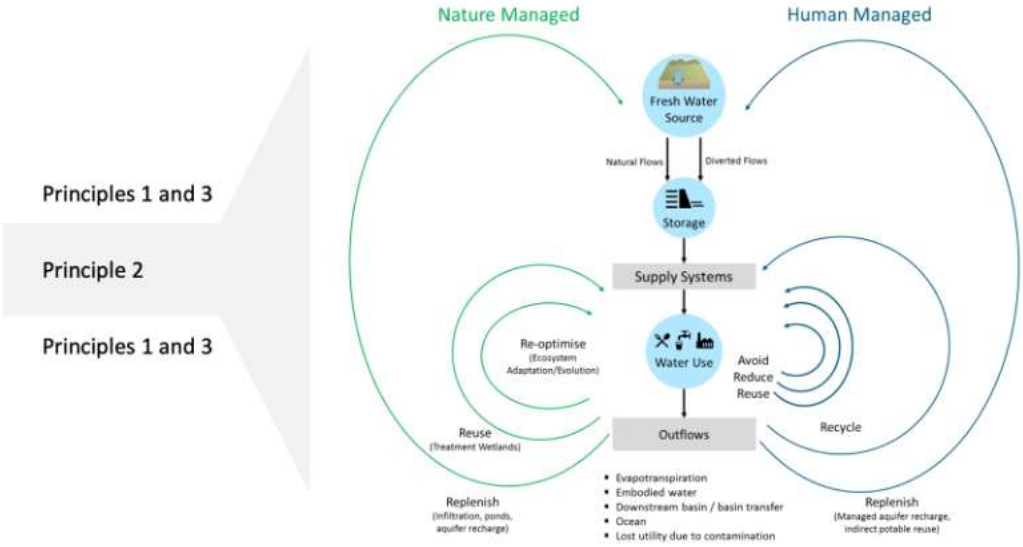


Figure 7: Circular Economy Systems Diagram for Water System

5.4 Construction & Demolition Waste (CDW) and Buildings

In 2017, it was reported that Malaysia generates 26,000 tonnes of construction and demolition waste daily, leading to the generation of nearly 10 million tonnes of wastes annually. Only 15% of overall demolition and construction waste in Malaysia are recycled annually, which is far behind countries such as Singapore, Germany, and South Korea, with the rate of 50%-75%[12].

Malaysian Green Building Council (MGBC)[13], an emerging member of the World Green Building Council (WGBC) should champion and increase efforts on material efficiency, reducing climate impacts by crafting a **Circular Economy Strategy for a Sustainable Built Environment** on top of the current Green Building Index (GBI). The European Commission has a new comprehensive one with relevant **policies for climate, energy & resource efficiency, management of construction and demolition waste, accessibility, digitalisation and skills**. The circularity principles that govern the **lifecycle of buildings** which Malaysia can draw inspiration and apply to the local context are as follows:

a) **Act 520** passed in 1994 to establish the Lembaga Pembangunan Industri Pembinaan Malaysia, also known as the **Malaysian Construction Industry Development Board (CIDB)**, to provide for its functions relating to the construction industry and for matters connected should be updated and revised to include the possible introduction of **recycled content**

[12] Esa, MR & Halog, A & Rigamonti, L. (2017), "Strategies for minimizing construction and demolition wastes in Malaysia". Resources, Conservation and Recycling. 120. 10.1016/j.resconrec.2016.12.014.
[13] Please read further at http://www.mgbc.org.my/about-mgbc/history/

requirements for certain construction products, taking into account their safety and functionality;

b) **MGBC, PAM, ACEM, CIDB** and **Public Works Department of Ministry of Works** can collaborate to promote measures to improve durability and adaptability of built assets in line with circular economy principles for building design and developing **digital logbooks**[14] for buildings and kick-off some pilot projects like **Buildings as Material Banks (BAMB)**[15];

c) Drafting a set of **material recovery targets** with relevant stakeholders for Malaysian legislation governing construction and demolition waste and its material-specific fractions to promote safe, sustainable and circular use of construction & demolition waste in the design of new buildings;

Malaysian cities can also refer to **the 'Renovation Wave' initiative** announced in the **European Green Deal** which is aimed to lead to significant improvements in energy efficiency in the EU and implemented in line with circular economy principles, notably optimised **lifecycle performance**, and **longer life expectancy of build assets** and how a similar initiative can benefit the country in the long-term.
Another proposal would be to create an e-platform like where second hand construction and demolition waste or materials can be sold at a lesser price or sourced on an interactive platform like https://www.enviromate.co.uk/marketplace

5.5 Household e-waste & hazardous waste (mercury from the TUBA)

In the Global E-waste Monitor Report 2020, it was reported that in 2019, the amount of e-waste generated will reach 74.7 million metric tons (Mt) by 2030, adding that the global amount of e-waste is increasing at almost 2MT per year, making efforts to recycle unwanted electronics more important than ever. On the Global E-waste website, it estimated that Malaysians generated 364 kilo tonnes (kt) of e-waste in 2019 or an average of 11.1kg per capita. Data for e-waste collection rate is marked as "not-available". The Department of Environment (DOE) has a website dedicated to raising awareness on e-waste, including information on the definition of e-waste, statistics, and how to properly dispose of household e-waste in Malaysia. The site also has a listing by state for e-waste collection points[16] in Malaysia.

[14] Please read further at https://www.rics.org/eu/news-insight/latest-news/news-opinion/rics-contribution-to-future-eu-framework-for-buildings-digital-logbook-b-log/
[15] Please read further at https://www.bamb2020.eu/
[16] Some places accept e-waste such as washing machine, air conditioner, mobile phones and even DVD players.

The Malaysian Communications and Multimedia Commission (MCMC) also has a listing for mobile e-waste collection boxes throughout the country where users can discard items such as unused mobile devices, AA batteries and accessories like chargers. In 2019, the DOE announced that it is proposing regulation to make it mandatory for consumers in Malaysia to send certain unwanted electrical items such as televisions, air conditioners and mobile phones to places that have been licensed to handle e-waste. DOE on its website stated that Environmental Quality (Household Scheduled Waste) Regulation is currently being reviewed by Attorney General's Chambers of Malaysia.

To overcome the above challenges and expedite solutions, Malaysian cities can refer to how the European Commission's **'Circular Electronics Initiative'** is being mobilised to complement existing and new instruments in the European Union and **how it aligns with the new sustainable products policy framework**.

To localise the solution for Malaysia and promote **circular electronics**, a pilot project can be launched to educate the public on

a) how to promote longer product lifetimes;

b) effective regulatory measures for electronics and ICT including mobile phones, tablets and laptops under a local Ecodesign Directive as proposed above. This is to ensure that devices are designed for **energy efficiency and durability, reparability, upgradability, maintenance, reuse and recycling**.

c) Like the EU's upcoming **Ecodesign Working Plan**, Malaysia should consider putting in place concrete steps on the implementation plan and focus on electronics and ICT as a priority sector for implementing the **'right to repair'**, including a **right to update obsolete software**;

d) **regulatory measures on chargers** for mobile phones and similar devices, including improving the durability of charging cables, and incentives to decouple the purchase of chargers from the purchase of new devices;

e) improving the **collection and treatment of waste** electrical and electronic equipment including exploring options with SWCorp and other national stakeholders if their current take back scheme outlets can also replicate the **EU-wide take back scheme** to return or sell back old mobile phones, tablets and chargers;

f) review of EU rules on restrictions of hazardous substances in electrical and electronic equipment and provide guidance to improve coherence with relevant legislation, including REACH and Ecodesign.

6. PHASE 4: IMPLEMENTATION REPORT OF THE ROADMAP

An Implementation Report is an essential tool to disclose how the country has measured the success of the implementation methodology that was incorporated from Phase 1 until Phase 3 above. It is a key component to document content that is crucial for delivering successful practical solutions for Malaysia after EU-Malaysia experts have undergone shoulder-to-shoulder collaboration with each other. It should also disclose the EU-Malaysia best practices applied for various scenarios and processes to simplify the circular solutions and design for the circular value chains to enable the local key players to adopt and implement at their levels. Lastly, it should also incorporate key information related to the various pilot project lifecycles for city implementers to extract, tweak and implement accordingly.

Figure 8: Key components of the Implementation Report of the Roadmap

The Implementation Report of the Roadmap should comprise of all the 8 components guided by the four (4) key pillars below to guide national leaders in their implementation of all four (4) phases and incorporating the Fair Process throughout.

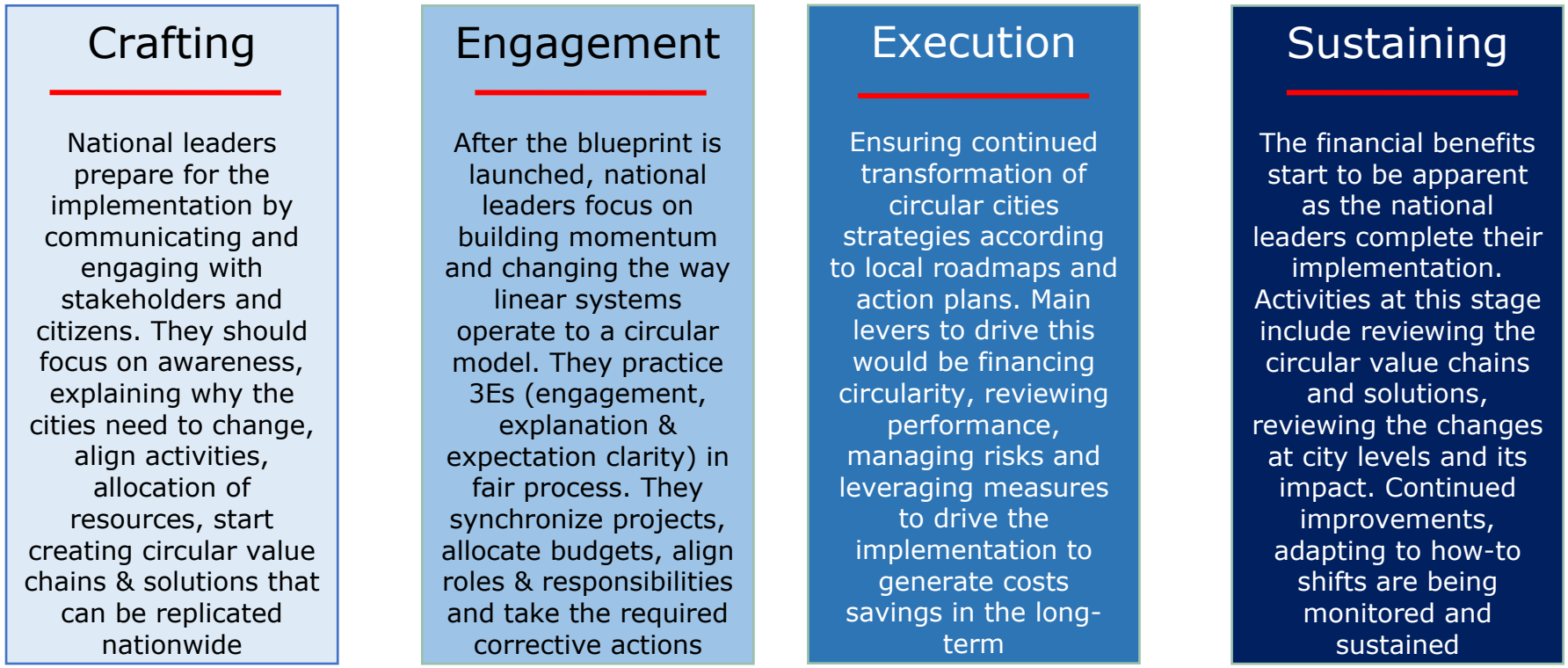


Figure 9: Four key pillars to guide National Leaders in the 4 Phase

Figure 10: Fair Process with National Stakeholders

6.1 Urban Metabolism: Inculcating Less Waste, More Value in Waste Streams

To address why Malaysian cities, need to shift from a linear urban system towards understanding the benefits derived from Circular Urban Metabolism is this. Cities are major engines for economic growth and can drive the circular economy agenda forward to unlock economic, environmental, and social benefits. Alongside Sustainable Development Goals and climate objectives, the transition to a circular economy will support Malaysian city leaders as they deliver against their priorities, which include housing, mobility, and economic development. This may not have been clearly spelt out in the Budget 2021 that was released on Friday, 6 November but local governments with the

federal government must work strategically towards fulfilling Strategy 4: Ensuring Resource Sustainability[17]

There are 4 key reasons why we need to encourage local governments in various cities in Malaysia to make this transition and these are just some answers that cities can provide to their citizens during the transition phases:

Planning for a circular city involves changing the way materials and products move around in a city. Instead of throwing materials 'away' to landfill or incineration, a new distributed system of resource management, nutrient flows, and reverse logistics makes the return, sorting, and reuse of products possible. Therefore, materials are always reuse.

Designing a circular city: Infrastructure, vehicles, buildings, and products are designed to be a combination of durable, adaptable, modular, and easy to maintain and repurpose. Nature inspires design. Materials are non-harmful, locally sourced and they are from renewable feedstocks. Also, where appropriate, they can be composted, recycled, and reused. It is also important to include how renewable energy can power cities.

Accessibility: People gain access to the things they need - be it space, products or transport - in new ways. This can be through sharing rather than owning, which can connect people to their neighbours and communities, or via product-as-a-service contracts.

Encourage a positive behavioural change: Products are no longer used just once. People repair and refurbish their products. These activities occur at the individual, community, and commercial level. Vehicles and infrastructure, from roads to street lights, are operated and maintained so that materials, energy, and water are used effectively and can be reused and recycled. Buildings are refurbished, improving how they are used and operated. New possibilities and jobs emerge. Cities that embed circular economy principles become more thriving, liveable, and resilient.

6.2 Circular Cities Portal for Circular Resource Management

As seen in **section 5.1 above**, in order to better manage waste prevention, re-use and recycling, it is first important to **transform linear resource flows** into **circular flows** by understanding material flows within each city. Malaysian cities in various States are essential partners in realising the circular economy and need more knowledge on how to map and understand material

[17] Please see page 46 of 52 of the 2021 Budget Speech by YB Senator Tengku Dato' Sri Zafrul Tengku Abdul Aziz, Minister Of Finance, Introducing the Supply Bill (2021) In Dewan Rakyat, Friday, 6 November 202, Theme: Stand United, We Shall Prevail.

flows (entry and exit points). We proposed this step-by-step approach inspired by the EU Urban Agenda.

Barriers

Transportation of household waste out of the city is usually designed as what is the quickest and cheapest way to do so. The same applies for any businesses from a time and costs perspective. Malaysian cities only have partial insight on accurate data on household waste and its resource flows within cities. Stakeholder consultations on 29 June, 2 July and 19 August demonstrated that data is fragmented as collection methodologies vary between parties in different locations.

Drivers

With a Circular Plastic Economy Roadmap at federal level to be launched in Q1 2021, this should inspire other cities at State level to jump on board such as Seberang Perai City Council (Penang) and Petaling Jaya City Council (Selangor) have done so with their city level roadmaps. Federal and state governments will have to arrange more progressive dialogues to ensure that knowledge and experience at federal and state level are available and translated into practical action plans and to motivate other cities to start crafting their own roadmaps as well. Collectively, this would realise the National Declaration that was addressed in **Section 3.1.2 above** and would enable more cities to contribute to the transition towards a circular economy.

Scope of Work and Proposed Methodologies

Malaysian cities can apply circular economy principles effectively towards achieving the elements in **Figure 8 and Figure 9 above** prior to submitting The Implementation Report of the Circular Cities Roadmap. All the 8 components guided by the four (4) key pillars to guide national leaders in their implementation of all four (4) phases should generate three key insights:

(i) A cities' resource metabolism;

(ii) The type of localised activities and how they are monitored & evaluated; and

(iii) How the execution structure can be replicated in other cities to facilitate pathways to shape the transition to a circular city with lessons learned along the way.

Potential Impacts at National Level

1. **Social** – the proposals above will reduce fragmentation, silo mentalities and harmonise methodologies on how each city can manage their resource efficiency and create green jobs in light of the Covid-19 pandemic and post-Covid-19.

2. **Financial** – circular business opportunities will grow as engagement; explanation & expectation clarity increases during fair process amongst all key stakeholders. As a result, Malaysia moves away from high costs of waste processing for municipalities and businesses towards increase of profits and financial savings with the use of secondary or recovered resources.

3. **Environmental** – a circular resource efficiency impact action plan at state levels driven by Mayors in cities and incorporating the proposals above will contribute towards the Ministry of Environment & Water's overall Sustainable Malaysia 2030 vision - contributes towards empowered governance, green growth, strategic collaboration and social inclusiveness as highlighted in Malaysia's Environmental Sustainability in Malaysia's 2020-2030 Roadmap.

4. **Connecting Circular Economy Solutions with the SDGs** – This is vital to help realise Budget 2021's Strategy 4 on Ensuring Resource Sustainability.

6.3 Circular Cities Roadmap in Each State

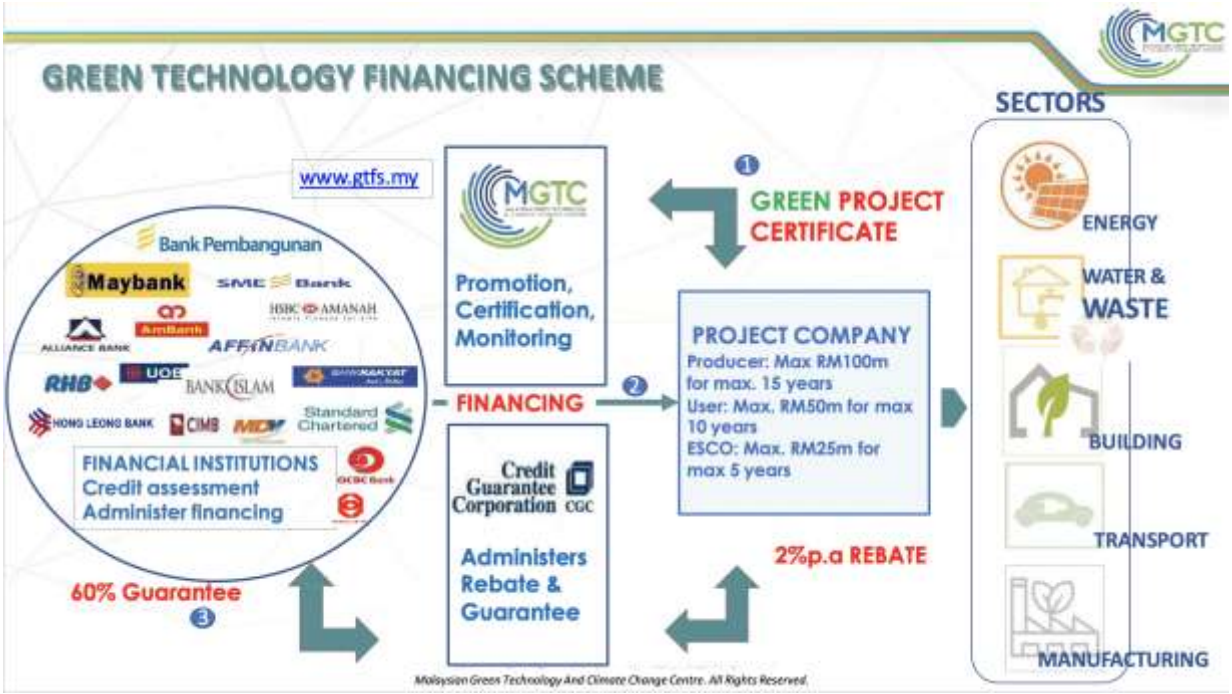
Roadmaps at Federal and State Level

The Roadmaps crafted at Federal level can spark the movement and journey for State governments to craft a **tailor-made roadmap to facilitate a resource and recovery efficiency plan in managing their state level waste streams** which in turn fulfils and contributes towards the targets of the Federal roadmap. This has already started in Petaling Jaya (Petaling Jaya City Council's Circular Economy Roadmap on Reduce and Manage Food Waste) coupled with their Surplus Food Redirection – A Pilot Study in Petaling Jaya in **Annex 1** and Penang (Seberang Perai City Council's Circular Economy Roadmap) in **Annex 2**. This ensures that the transition from linear to circular cities is a **collective national effort where no stakeholder works in silo**.

6.4 Circular Economy Financial Incentives for Malaysian Cities

Annex 3: Concept Note for Financing Circular Economy in Cities is attached behind this Report for consideration by the Federal Government of Malaysia. Moving forward, close engagement with the other key stakeholders in the quadruple helix (government, private sector, academia/researchers and the civil society) are important to address the current financing gaps and challenges as depicted below as this will be faced by implementers at the city level as well.

It is also important to engage with the IURC Asia project team next year on how **Annex 3 can complement and strengthen the GTFS Scheme which is now moving towards GTFS 3.0** to include **circular economy projects and initiatives at a city level.**



Finally, to explore how the **three financial mechanisms and their deadlines below can be extended and to also include circular economy businesses as well.** Currently, they do not provide for **the growth of B corps and growth of circular economy practitioners** to benefit from the below:

Green Investment Tax Allowance (GITA) Assets

GITA Assets are for companies that acquire qualifying green technology assets and there are listed under MyHIJAU Directory. Companies should comply with ALL of the following criteria:

- The companies should minimise the degradation of the environment or reduce greenhouse emissions.
- They should promote health and the improvement of the environment.
- They need to conserve the use of energy, water and other forms of natural resources, or promote the use of renewable energy, or are able to recycle waste material resources.

The Rate of Incentive

- Green Investment Tax Allowance (GITA) of 100% of qualifying capital expenditure incurred on approved green technology assets from the date of purchase until 31 December 2020.
- The allowance can be offset against 70% of statutory income in the year of assessment.
- Unutilised allowances can be carried forward until they are fully absorbed.

Green Investment Tax Allowance (GITA) Project

GITA Projects are for companies that undertake a qualifying green technology. Companies should comply with ALL of the following criteria:

- minimise the degradation of the environment or reduce greenhouse emission
- promote health and improvement of the environment
- conserve the use of energy, water and/or other forms of natural resources, or promote the use of renewable energy, or are able to recycle waste material resources

The application should be received by MIDA until 31 December 2020.

Rate of Incentive

- Green Investment Tax Allowance (GITA) of 100% of qualifying capital expenditure incurred on green technology project from the date of application received by MIDA until the year of assessment 2020.
- The allowance can be offset against 70% of statutory income in the year of assessment.
- Unutilised allowances can be carried forward until they are fully absorbed.

Green Income Tax Exemption (GITE) Services

GITE Services is for companies which provide green technology services which have been verified by GreenTech Malaysia, and listed under the MyHIJAU Directory. Companies must meet the criteria of green technology service providers as follows:

- At least one competent/qualified personnel in the respective green technology*[18];
- Must have a green policy related to the environmental or sustainability**[19]; and
- 100% income must be derived from the respective green technology services.

Rate of Incentive

100% of statutory income from the date of application received by MIDA until the year of assessment 2020 (the maximum period is 5 years from the date of commencement).

6.5 Making Circularity Work for Citizens and Cities in Malaysia

Figure 8 above clearly indicates the importance of green jobs linked to the circular economy for Malaysia. If we look at the European Union countries, it was reported that the number of jobs linked to circular economy grew by 5% to reach around 4 million across the EU[20]. This similar positive effect can also be achieved by Malaysia by providing local workers the needed skills to smoothly migrate towards the green & circular economy transition. Here, EU-Malaysia opportunities can be explored where EU experts provide a digital and in person (depending on how Covid-19 pans out) knowledge transfer programme throughout the Phases proposed in this Blueprint on a Needs Basis.

The European Union Delegation to Malaysia can dialogue with the federal and local governments to come up with a wish list on what assistance is needed by Malaysia to support skills and job creation locally to contribute to accelerating the transition to a circular economy such as

i. National Skills Agenda

[18] *Note: Competent personnel are defined as holding a certificate of competency as a service provider in the related field of green technology. The certificate must be recognised by the Government or a Professional Body in Malaysia.

[19] **Green Policy is a statement about the commitment to sustainability and environment management by the company. All applications must be submitted to MIDA before 31 December 2020.

[20] Please refer to https://www.oecd-ilibrary.org/sites/7bf512c1-en/index.html?itemId=/content/component/7bf512c1-en and [75] EC (2020), Impact of Shift to Circular Economy, European Commission

ii. Investment in education and training systems, lifelong learning and social innovation promoted under EU-Malaysia cooperation

iii. Capacity building in areas where EU best practices are transferred from European Urban Initiatives and localised for Malaysia to assist in growing intelligent circular cities which is one of EU's priority areas under the Green City Accord.

iv. To open up European Circular Economy Stakeholder Platform to enable Malaysia to benefit from the exchange of information.

7. CONCLUSION, RECOMMENDATIONS, NEXT STEPS

This Circular Cities Blueprint for Malaysia will need to be shared with the federal and state governments together with national stakeholders for inputs and feedback especially after the launch of the Malaysia's Circular Plastics Economy Roadmap (CER) in Q1 2021 to ensure that both Roadmaps are working in harmony with each other. A national stakeholder consultation is proposed for Q1 2021 for the European Commission's consideration. In the meantime, some proposals below are attached as well.

Recommendations to the European Commission to strengthen EU-Malaysia bilateral relationships:

- There should be bilateral dialogues in Q1 2021 to discuss the funding and knowledge transfer made available to foster EU-Malaysia collaborations in pilot projects via city-to-city pairing and connecting parties to practice industrial symbiosis.
- EU-Malaysia experts should work together to develop indicators to be able to measure the progress of the transformation process.
- EU member states who have developed measures in their waste prevention programmes and collected valuable knowledge from the implementation should share best practices with the Malaysian counterparts.

The necessary next steps

- Promote bilateral EU-Malaysia collaboration for the circular cities transition in Malaysia.
- To deliberate if EU resources and funds can be directed to help solve the challenge of scalability in Malaysia.
- Highlight and draft the policy challenges that arise from the implementation phases (1-4) mentioned above and thereafter jointly design targeted capacity building programmes with city councils and their key stakeholders to address the needs of Malaysia.
- Ensure bilateral collaboration results in a good learning environment for all the

knowledge generated within the different programmes, projects and networks promoting EU best practices to Malaysians and connecting them to the SDG goals listed below.

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8. ANNEX 1 – CONCEPT NOTE FOR PETALING JAYA'S DIGITAL INNOVATION HUB

Cities	**Petaling Jaya in the Selangor State[21] (MY)**	**Circle Economy[22], Metropolitan City of Bologna and Milan City Council**
State/Country	Malaysia	Italy, Granada
Population	772,763	Bologna is 806,000 Milan is 3,140,000
Size in km²	97.2 km²	Bologna is 140.09 km² Milan is 181.8 km²
Themes of cooperation	**Petaling Jaya Digital Innovation Hub:** Circle City Scan Tool[23] (measure & monitor waste streams), Social Street Tool[24] (mobility) and e-book on circular business models: SDG 9, 11, 12, 14, 17	
Scope of cooperation	The pilot project will provide local government and Petaling Jaya City Council support towards the *Petaling Jaya Smart City 2030* framework with tools that deliver evidence and insights to city decision-makers to accelerate circularity and implement practical solutions to enable the transition to a circular city using digital solutions. This will involve 1. **Easy-to-use analytical tools** that help city officials and urban change-makers to measure material flows, monitor circular economy metrics & circular economic activity, and associated social and environmental impacts. 2. A **library of innovative CE case studies and policies** for urban change-makers and city officials to learn about relevant solutions. 3. An **ecosystem of solution providers** to connect to and begin implementation.	

[21] On 20 June 2006, Petaling Jaya was granted a city status and is now known as the leading growth centre in Selangor. Petaling Jaya has a total population of over 772,763 people and the number of property holdings of 254,174. Petaling Jaya's officials are exploring a pilot project on sustainable urban metabolism by optimising urban material flows & value retention with digital technologies improving waste stream practices in relation to plastic pollution and packaging and possibly other types of waste where the city continues to promote regenerative resources (bio-based materials, renewable energies) and keeping materials in the loops as long as possible.

[22] Circle Economy is a not-for-profit organisation, and partially relies on the support of philanthropic partners to carry out the work they do. Please visit https://www.circle-economy.com/about

[23] A Circle City Scan Tool is a guided digital innovation toolkit to accelerate Petaling Jaya's circular economy journey. It will serve three functions: measure, monitor and engage. It is also used to guide urban circular transformation by providing an innovation platform with solutions providers and engagement for all things.

[24] A tool that looks to improve public transportation and logistics of transport of goods in the area to reduce urban congestion, improve logistics to meet the actual needs of the city.

	This cooperation will involve working closely with **PJ Smart City Framework Team** who current monitors **54 dashboards**[25] with some consultants at the Mini-Smart Centre[26]. **Output: Development of circular economy contents & modules for integration into the existing smart city platform / dashboard.**
Key challenges of cooperation theme	**Circular Economy**: Petaling Jaya city has a growing population and a rising urban middle class. It has led to an increase in the demands and pressures on urban infrastructure, and an increase in the consumption of resources which is still largely operating on a linear 'take-make-use-waste' model despite many environmental initiatives have been implemented at the community level. To better manage its top 5 challenges[27] leading to structural waste (and consequently lost economic opportunities) as well as negative impacts, it currently lacks a solution enabled by digital technology that can help the city preserve and enhance its natural capital, optimize resource yields and minimize system risks by managing finite stocks and renewable flows.
Main Objective of cooperation	**Development of a circular economy App (contents, modules) to be integrated into the existing smart city platform / dashboard**. Contents may include: → Digital technology as an enabler for easy access to best available material flows data (stipulating the types of data that will be collected for analysis). → Support methodologies proposed by EU-Malaysia circular economy experts and leading institutions to strengthen decision making, including sustainable procurement and new initiatives targeting behavioural change. → Additionally, supporting the PJ's Smart City Framework team with circular economy modules to be showcased at the Mini-Smart Centre. This will improve accessibility and communication for citizens.
Area of Action: Short description of main activities and key outputs	The below areas of action have to be executed in phases to help Petaling Jaya City Council to achieve their short term, medium and long-term goals:

[25] Please visit http://mykms.mbpj.gov.my/attachments/article/452/info%20Smart%20PJ%20v1.pdf
[26] Please visit https://www.thestar.com.my/metro/metro-news/2020/03/17/smart-centre-comes-into-operation
[27] On 29 June, Petaling Jaya City Council shared their top 5 challenges as (1) Food and organic waste (2) Plastic pollution and packaging (3) Construction material flow and design (4) Household e-waste (5) Lack of digital sharing tools & platforms as enabler for circular cities. On 19 August, solution to (5) was a preferred choice for pilot project.

	→ Inspired by the EU Circular Economy Platform showcased in the IUC webinar from June 2020, we would like to create a **city-wide platform** involving quadruple-helix stakeholders (city government, research, business and civil society). → Inspired by the **Milan case** work showcased in the IUC webinar from August 2020, we would like to create a digital **Social Street Tool** to improve mobility in congested areas and better support Petaling Jaya's current **eco-mobility framework** as a transit city. → Inspired by **Bologna's** work showcased in the IUC webinar from August 2020, we would like to publish an **e-book** with circular business models on Circular Food Waste[28], 3R (reuse, reduce & recycle) Sustainable Consumption & Production & directory of vendors practicing tech loop solutions together with best practices from Bologna and & Milan[29]. → Inspired by the **Circle Economy** work showcased in the IUC webinar from June 2020, we aim to develop a **Circular Economy App** (open access tool) that guides city decision-makers to measure & monitor waste streams within the Petaling Jaya Smart City Framework. The app will also have a **public interface** for citizens. It will be synchronised with other apps like *MyReturns* which is currently pending approval before launching it by PJ City Council.
Expected results - benefits	→ The **Circle City Scan Tool** would include a ***Digital Material Flow Analysis (MFA)*** module to enable external consultants and municipality's internal analytical teams to perform material flow analysis to identify circular opportunities and to produce visual reports that can be effectively presented to policy decision makers. → The project would create public awareness to collect **bottom-up material flow data**. It would empower citizens to share evidence on waste management, thus contributing to the circularity in the city. → Through working with the Circle City Scan Tool, Petaling Jaya would have **access to many case studies**, facilitating the establishment of a **City Knowledge Hub**. The hub would also provide a comprehensive overview of local circular economy initiatives, thus enabling authorities and local businesses to learn from the successes of other cities and further refine Petaling Jaya circular economy agenda.

[28] Petaling Jaya City Council has already completed their first draft of the Circular Economy Roadmap on Petaling Jaya's Food Waste Strategic Initiatives and Surplus Foo Redirection – A Pilot Study in Petaling Jaya. A final version will be launched in November during their Petaling Jaya Waste Summit in November 2020.

[29] MADRE project (Metropolitan Agriculture for Developing an innovative, sustainable and Responsible Economy) is one of the 14 projects under the umbrella of the MED Green Growth community, in the framework of the Interreg MED programme. Good example of the application of the quadruple helix of the green growth sector to support MED stakeholders and create a fruitful and collaborative environment for all implicated bodies.

	→ **Co-Create an opportunity radar that accurately reflects Petaling Jaya.** The opportunity radar will be based on experts' and citizens' inputs (open platform, thus co-created) and will be driven by an algorithm which prioritises opportunities. This will enable local consultants / stakeholders in identifying and shortlisting possible projects in their city. → **By developing a City *Circular Economy Stakeholder Platform*** [30] **,** Petaling Jaya will activate a set of local stakeholders who can collaborate on problem definition and co-create and implement solutions. This will link solution providers ranging from implementation organisations to knowledge consultants who can support the design and delivery of an appropriate solution.
Requested support	→ **Experts** from **European cities** and **organisations** to support the categories development for the City *Circular Economy Stakeholder Platform* → Utilise the Circle City Scan Tool from the Circle Economy NGO to develop the *Opportunity Radar* → **Estimated budget: 15.000 €** (costs breakdown available)
Non-EU city contact person	Mr. Lee Lih Shyan, Director of National Solid Waste Management & Public Cleansing, Petaling Jaya City Council
European city contact person	Mr Blake Robinson & Ms. Marijana Novak, Circle Economy Mr Piero Pelizzaro, Chief Resilience Officer, Milan City Council Mr Marino Cavallo, Head of Research, Innovation and Management of EU Projects, Metropolitan City of Bologna
IUC Asia contact persons	Mr Pablo Gándara and Ms. Jacqueline Chang

[30] Italian Circular Economy Stakeholder Platform (ICESP). More information https://circulareconomy.europa.eu/platform/en/about/cg-activities-documents/icesp-italys-circular-economy-platform

9. ANNEX 2 - CONCEPT NOTE FOR PENANG'S CIRCULAR PLASTICS ECONOMY

Cities	**Seberang Perai and Georgetown in Penang State[31] (MY)**	**Global Alliance to End Plastic Waste (AEPW)** & **Gemini Corporation N.V.[32], Greater Manchester (UK)**
State/Country	Malaysia	Various EU cities and UK
Population	1.78 million	1,869,730 (Antwerp) 2.71 million (Greater Manchester)
Size in km²	751 km² (Seberang Perai) 121 km² (Georgetown) 1,048 km² (Penang State)	204.5 km² (Antwerp) 1,276 km² (Greater Manchester)
Themes of cooperation	**Circular Plastics Economy**: Traceability of plastic data (measure and monitor waste streams), Public Sector Plastic Pact, Circular Economy Roadmap, policies/by-laws, initiatives to nudge behavioural change: SDG 12, SDG 14, SDG 17	
Scope of cooperation	The pilot project will serve to establish and disseminate good practices and shall consist of tangible initiatives that demonstrate change and results. New approaches or up-scale existing best practices will be tested with a close link to policy dialogues and processes, strategies and regulatory reforms at the city level. The scope for the pilot project will be targeting the area of management of plastic waste, traceability of plastics, improved policies/by-laws on SUPs including support towards the *Extended Producer Responsibility (EPR) Scheme for Malaysia* and deposit return schemes (DRS) for packaging and plastic products, new/innovative approaches in managing plastic waste and integrating informal waste management workers. The cooperation shall bring together public, civil society, academia and private sector stakeholders in a specific location (cities) in Penang. **Output: Development of circular economy contents for local policies/by-laws, government procurement, roadmap and**	

[31] Penang's population stands at nearly 1.78 million as of 2020 with Seberang Perai as Malaysia's 2nd largest city by population followed by Georgetown. It has among the nation's highest population densities and is one of the country's most urbanised states. Penang has been able to boast a buoyant economy over the last decade as its GDP grew steadily at 5.1% in 2018, outpacing the national growth rate of 4.7%.

[32] VAT registration is in Belgium, UK, Spain, Poland, Slovenia, Italy, France, Germany, the Netherlands, Finland, Sweden, Austria and Russia.

	to improve data traceability of plastic waste streams in Penang.
Key challenges of cooperation theme	**Circular Economy:** Driven by rapid urbanisation, economic development and changing consumption and production patterns, the amount of single-use packaging and plastic items is rapidly increasing in Penang especially since the outbreak of Covid-19. At the same time, waste management systems still lack effectiveness in terms of environmentally sound collection, sorting, recycling, energy recovery and disposal of packaging waste. These trends significantly contribute to marine littering – a growing regional and global threat to marine ecosystems and fisheries as well as the tourism sector. Governments, businesses, academia and civil society increasingly recognise that a switch towards a circular economy approach to plastic waste is necessary to tackle these challenges.
Main Objective of cooperation	**Facilitate the coordination of the concrete cooperation projects for the thematic cluster in Penang focusing on quick wins to swap SUPs with alternatives, 3Rs (remove, reduce, replace), sustainable procurement and new initiatives targeting behavioural change.** Areas of focused include: → Improved methodologies in data collection in relation to traceability of plastic waste. → Support local city councils in implementing their Circular Plastics Roadmap to strengthen decision making including sustainable procurement, growing the informal sector network and new initiatives targeting behavioural change. → Support policy makers in incorporating circular economy solutions and recommendations in local regulations/by-laws.
Area of Action: Short description of main activities and key outputs	The below areas of action have to be executed in phases to help Penang City Councils to achieve their short term and long-term goals: **Short-Term Targets** → Inspired by the efforts of Global Alliance to End Plastic Waste member Gemini Corporation N.V. during the IUC webinar in July 2020, we would like to increase the uptake and collaboration with the **informal sector** by growing a network of reclaimers (an **e-directory community platform**).

	→ Weightage EPEAT [33] : An example would be government procurement where extra weightage is given to goods made with recycled contents. To assist Penang Green Council to create a network of green industries to come together where this can serve as a tool/database for the local & international organisations to look into the existing green services in Penang. → Inspired by Greater Manchester Combined Authority's Public Sector Plastic Pact during the IUC webinar in July 2020, we would like to receive guidance from EU circular cities project partners to create a network which bring together the key stakeholders to implement solutions towards a circular economy of plastic. → Inspired by new initiatives to reduce Single Use Plastics (SUPs) by Greater Manchester Combine Authority we would like to implement behavioural change initiatives with local F&B outlets and other private sector players. Example, recognition like Penang Green Office certification to include an assessment criterion on plastic in year 2021. **Long-term Targets** → Solutions to **data collection on plastics** for Penang cities - manual approach (A system like the European Commission can be applied where the movement of any kind of waste needs to be accompanied with an Annex VII document which tracks the entire movement. EC Regulations (page no. 32 – Chapter 2, Article 18) and possibly a digital solution pilot test to scale Zero Waste Network[34] and Trash2Treasure mobile apps[35] → **Innovation & research to inform policy** – moving to a Circular Economy (looking into collaboration with the related partner in sharing information and technologies on this with the local authorities and local councils in Penang) → **Government procurement guidelines** to strengthen sustainable procurement which is similar with current MyHIJAU by Malaysian Green Technology and Climate Change Centre (MGTC)
Expected results - benefits	→ **Best practices** shared, and cities benefit from knowledge sharing on circular economy practices.

[33] EPEAT (Electronic Product Environmental Assessment Tool) is a ranking system that helps purchasers in the public and private sectors evaluate, compare and select products they plan to buy/purchase based on their environmental attributes. The full criteria can be found online at https://www.epeat.net/resources/criteria-2/. An example of compilation of data sources can be found at https://www.epa.gov/sites/production/files/2018-02/documents/eebc_multifunction_device_color.pdf

[34] Please visit http://www.pgc.com.my/2020/zero-waste-network-zwn/

[35] Please visit http://www.pgc.com.my/2020/trash2treasure-t2t/. The Penang State government has introduced Waste Generators Pay Policy and it is currently implemented by the Penang Island City Council and will be implemented by Seberang Perai City Council in 2021 to further benefit the generators and receivers where the wastes from the generators could be the useful materials for the receivers. The State is also planning to have a waste directory by using business match-making mechanism to promote circular economy.

	→ **Traceability of plastics** – To improve both manual data collection and digital apps to assist Penang to achieve their target of above 30% recycling rate by 2025 (for plastics) → **Circular Cities Roadmap for Penang Cities to reduce SUPs** to be implemented in phases with better operational and planning support from Greater Manchester Combined Authority → **Improved policies /by-laws to reduce SUPs** to strengthen (i) education and enforcement of Separation of Waste and Licensing of Recyclable Waste Collection Services (MBSP/MBPP) By Law 2016 (ii) EU input to Say No To Single Use Plastic By Law targeted for 2022 (iii) State Government and City Councils working with NGO's and private sectors in implementing sustainable living including zero waste communities (iv) improve rewards or Incentives (currently through "Penang Green Citizen[36]" by PGC)
Requested support	→ **Experts** from **Gemini Corporate N.V.** to propose improved methodologies on plastic data traceability and building an e-directory for informal sector community platform → **Experts** from **Greater Manchester Combined Authority** to create the Public Sector Plastic Pact in Penang & strengthen local policies/by-laws → **Estimated budget: 15.000€** (costs breakdown available)
Non-EU city contact person	Ms. Josephine Tan, General Manager, Penang Green Council
European city contact person	Mr Vikas Chhajer, (Belgium) Ms Michelle Lynch, (Manchester)
IUC Asia contact persons	Mr Pablo Gándara, Ms. Jacqueline Chang

[36] http://www.pgc.com.my/2020/communication-marketing/

10. ANNEX 3 – CONCEPT NOTE FOR FINANCING CE IN CITIES

Introduction

Financing circularity initiatives has a critical role to play in building a more sustainable, healthy and resilient future. Scaling the circular economy in cities helps to achieve this, while **unlocking** new and better growth **opportunities** for local governments to work with businesses and other key stakeholders of all sizes as they transition and develop circular cities in Malaysia nationally. The **Malaysian Government** is currently elaborating the **Circular Economy Roadmap for Plastics** to be rolled-out in cities 2021. Moreover, the Government is eager to receive ideas for other areas to achieve an **integrated** circular economy approach. At the same time, **regional** (State) and **local governments** are developing own circular economy **strategy plans** in line with the Sustainable Development Goals (SDGs) and climate action objectives. Partners from research, business and civil society in Malaysia can contribute and critically assess these initiatives. As major engines for economic growth, **cities** need **financial** support in this transition process to drive the circular economy agenda forward achieving economic, environmental, and social benefits for the country.

The **transition** to a circular economy will support Malaysian city leaders as they deliver against their priorities, which include housing, mobility, and economic development. These are also **similar priorities** to those formulated in the **Urban Agenda** of the **European Union**, which supports the transition to the circular economy in cities through better knowledge, better regulation and better funding - three key pillars of EU policy making and implementation.

To ensure that this ecosystem will thrive for the long-term, this **concept note** is proposing for Malaysia:

a) To establish a **National Circular Action e-Hub** to facilitate this entire process based on some European examples and best practices. The hub can be a catalyst for unlocking opportunities and support the two (2) **pilot projects in Penang and Petaling Jaya** that have been proposed by the IUC project in September 2020. This would facilitate the national roll-out of other circular economy / city projects.
b) It will also layout some **proposals** needed to **establish synergies** with **national institutions**, including the Malaysian Green Technology & Climate Change Centre (MGTC). Moreover, the concept notes aim to explore cooperation with the Green Technology Finance Scheme (GTFS) to provide additional financial tools, thus **boosting** the circular economy and sustainable smart city initiatives in Malaysia from 2021 onwards.

As a result of (A) and (B), Malaysian cities will be **enabled to shift** towards a circular model to increase their medium- to long-term competitiveness, becoming more appealing to financial institutions in terms of funding and financial support, while creating a **positive impact** within local communities.

Executive Summary

Actions	Short Description	Outputs
Better Funding		
Prepare a **National Circular City Funding e-Guide** to assist local governments to have better access to funding their circular cities pilot projects	**The National Circular City Funding e-Guide** is a tool that will improve access to funding for circular cities pilot projects in Malaysia that can be downloaded from the National Circular Action e-Hub. This e-guide should contribute to scaling and speeding up the access to finance to help circular transition in cities.	Refer to an example of the **European Union's** interactive funding platform available here https://www.circularcityfundingguide.eu/ Work with MGTC GTFS team.
Mainstream the circular economy as an eligible area into the **National Budget in 2021/2022 and corresponding funds** to achieve Malaysia's 2030 targets and SDG goals	The **National Budget in 2021** will emphasise on socio-economic, environmental sustainability where the Ministry of Finance will study and redefine its context post Covid-19 economic recovery framework. It is important that Malaysia looks at how the **European Union** is mainstreaming their circular economy into its policies in particular Cohesion Policy (which through its corresponding Funds amounts to around 1.3 of the total EU Multi-annual Financial Framework, can provide the required impetus for the promotion of the transition towards circular economy starting from the urban level.	Refer to an example of the EU's Final Report with recommendation and position paper Work with Ministry of Finance, Malaysia
Better Knowledge		
Prepare an **implementation plan** for the **National Circular Action e-Hub** with MGTC's GTFS team by expanding existing platform at https://www.gtfs.my	This e-platform is an open source shared financial knowledge database inspiring and guiding cities towards their implementation of a circular city. It is a one-stop integrated platform that links local governments and urban decision makers to accessible and innovative	Studying and incorporating best practices from EU initiatives and localise it for Malaysia

/page/features-gtfs-20	financing tools coupled with advisory & technical services that can be accessible via an e-directory of key contact points in the local languages similar to EU platforms in other European languages.	https://vlaanderen-circulair.be/ circular governance/index.html https://eiah.eib.org/about/initiative-circular-economy.htm https://www.circularcity fundingguide.eu/funding-types-and-their-applicability/advisory-service-providers/european-investment-advisory-hub/ https://www.circle-economy.com/programmes/finance

Stakeholder Consultations

Three (3) stakeholder consultations (accumulated total of 300+ pax) have been carried out with EU-Malaysian stakeholders on 29 June (**Petaling Jaya**), 2 July (**Penang**) and 19 August (**open to all cities**) including representatives from **Iskandar, Johor** and from the **European Union**. The online stakeholder consultations brought together all key stakeholders from the two Malaysian **pilot cities** and attracted other cities to discuss with representatives from the Malaysian government, private sector, research and civil society.

Experts from the European Union and Malaysia exchanged on circular economy challenges and solutions identified in the online sessions. They also explored how **city-to-city cooperation** with European counterparts will support the transition of Malaysian cities to circular cities. Experts from the European Union side shared how their city councils & municipalities have managed to tackle the above-mentioned challenges collectively. They also identified **challenges** to implementation.

In the consultations, experts also discussed several schemes for **financing circularity** in order to enable Malaysian cities to unlock potentials in the transition to circular and sustainable economy. They also recommended ways to support **emerging industries** and creating **new jobs** with higher added value.

After conducting the below poll in ***Figure 1 below***, the IUC Asia project team has identified that a National Circular Action e-Hub was vital to the success of the two (2) pilot projects under development.

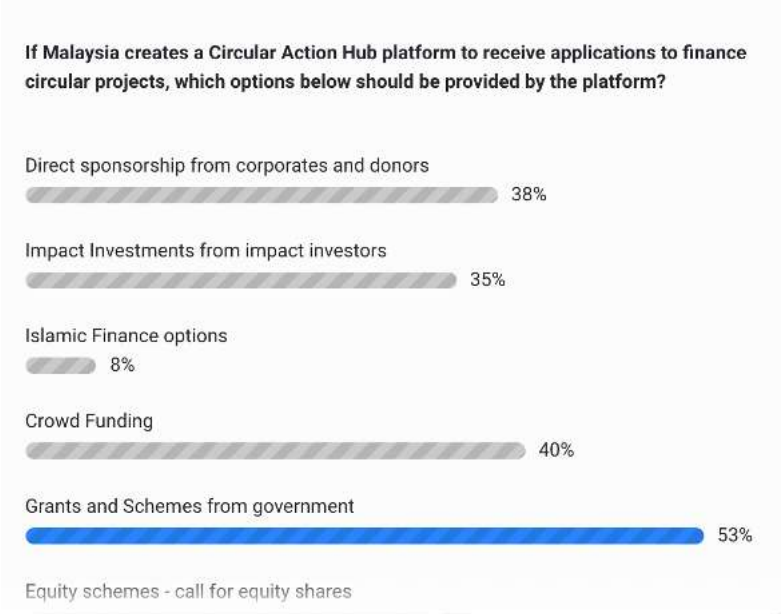

Figure 1: Poll conducted on 19 August 2020 with 90+ EU & Malaysian stakeholders

What is a National Circular Action e-Hub?

It is a **one-stop** open-sourced integrated **e-platform** with a shared financial knowledge database inspiring and guiding Malaysian cities towards their implementation of a circular city. It **links local governments** and urban decision makers to accessible and innovative financing tools coupled with advisory & technical services that can be accessible via an e-directory of key contact points in the local languages. It **reviews applications** for financing circular cities pilot projects in Malaysia with access to local and global sources. Construction of this e-Hub will come with the assistance of **EU best practices** and networks to finance scalable local projects to support and accelerate circular transition and action plans via various innovative financing tools based on performance-based payments for an inclusive circular economy.

The online platform that connects circular cities pilot projects and initiatives with grants & schemes from government, sourcing for crowd funding, direct sponsorships from corporates & donors and impact investors should be easily

accessible and featured as an addition on MGTC's existing platform https://www.gtfs.my/page/features-gtfs-20. The e-Hub, is an **important piece** of the circular economy ecosystem for Malaysia, connecting and supporting a wide range of actors that play important roles in this space. In particular, it must act as an **inclusive system** that removes barriers to access to finance imposed if local financial institutions are approached directly.

It should also provide a National Circular City Funding **e-Guide**, a tool that will improve access to funding for circular cities pilot projects in Malaysia that contributes to scaling and speeding up the circular transition in cities.

Recognising that there is a huge **diversity** of challenges, technologies, and approaches that can be used by the local governments to transition to circular cities, the e-Hub does not exist to provide a 'one size fits all' approach. Instead, it encourages a '**learning-by-doing'** approach and should act and progress with continuous improvement of its requirements based on the experience learned with the participating two (2) current circular cities pilot projects in Penang and Petaling Jaya.

At the same time, a parallel approach must also be applied to promote **better funding** where local governments dialogue with the federal government e.g., Ministry of Finance to mainstream the circular economy as an eligible area into the National Budget in 2021/2022 and corresponding funds to achieve Malaysia's 2030 targets and SDG goals.

Based on the above premise, the National Circular Action e-Hub should be designed to achieve effective and socially-inclusive circular economy financing and advisory mechanisms enabling national support of circular cities pilot projects and eventually to include other circular economy initiatives implemented in Malaysia.

Matrix for Implementation of e-Guide and e-Hub Financing Tools

	Intervention Instrument	Grants and Schemes from Government	Credit schemes, guarantees & alternative schemes	Direct sponsorship from corporates and donors	Equity Schemes	Circular Economy Green Bonds/Economic Instruments
Public services	**Circular Urban Infrastructure & Circular Rural Services**	Co-funding for the Public Private Partnership; Livelihoods Fund for Family Farmers in Mexico Matching grant under Domestic Investment Strategic Fund (DISF), Program Malaysia Social Innovation (MySI) to include CE innovations, MIDA[37]	Crowdfunding for green spaces: MyParkScotland & Institute of Entrepreneurship Development, the Regional Fund for Science and Technology	Malaysian corporates, donors and investors who provide direct funding enjoy tax exemptions and incentives in return	Call for Equity Shares: Featured on the e-Hub e.g., ICLEI Innovation Rio de Janeiro, São Paulo, Porto Alegre	Eco-tax schemes: Dutch tax incentive for material passport buildings Local financial institutions including CE projects in current green bonds e.g., CIMB SDG Bond Framework, green sukuk
	Circular municipal services or city services	Matching grant under Domestic Investment Strategic Fund (DISF), to include CE innovations & technology, Sustainable Development Financing Fund[38] and MIDA	Urban Reuse Agency; Municipality of Prato closed water cycle	Malaysian Business Angels Network (MBAN)		SPP product service agreements: Bremen car sharing service
Businesses	**Resource efficient industrial development & community developments**	Grants for projects to promote circular economy: Catalan Waste Agency Circular Vouchers: Turkish Material Market Place	Credit lines: EBRD Sustainable Energy Financing Facilities (SEFFs)	The Master Sustainability Fund by Scania (Sweden) in Malaysia can be expanded to include CE		Sustainability-Linked Loans (SLLs) e.g., CIMB Bank and CIMB Islamic Bank Soft Loans from Development Financial Institutions (DFI) - Bank Pembangunan Malaysia Bhd and Malaysian Industrial Development Finance Bhd (MIDF)
	Eco-innovative business ideas and start-ups	Start-up Support: LWARB Accelerator programme, Glasgow Circular Economy Business Support Service Malaysia: Cradle Fund Programmes, Magic, Revive SIX under AIM, Malaysian Technology Development Corp (MTDC)	Open Innovation Challenge: Amsterdam Circular Challenge, Circular Credits by ByRio in Brazil Microcredits to finance working capital needed for resource efficiency improvements in small businesses	Malaysian Business Angels Network (MBAN)	Investment Fund e.g., Greater London Investment Fund, Glasgow Circular Economy Investment Fund	Soft Loans from Development Financial Institutions (DFI) - Bank Pembangunan Malaysia Bhd
Households	**Circular living community initiatives**	Grants for sustainable living projects: Smart City Cologne GO funding programme Assessment Tax Rebate Scheme by Petaling Jaya City Council	FabLab Partnerships: Fab City Global Initiative	Malaysian corporates CSR programmes CIMB Foundation Axiata Foundation		
	Circular household practices	Repair Fund: 'Fixotek' repair and share centres		Malaysian donors & universities sponsoring monetary and in-kind community workshops and pilot projects in neighbourhoods		

Figure 2: Innovative Circularity Financial Tools– Combination of EU- Malaysia Proposals

[37] MIDA is the Malaysian Investment Development Authority

[38] The Sustainable Development Financing Fund is a RM 1 billion (Euro € 217.4 Million) financing scheme announced in Budget 2019 and championed by Bank Pembangunan Malaysia Bhd (DFI in Malaysia) based on business models related to Sustainable Development Goals (SDGs). The Budget for 2021/2022 should also include CE projects that advances the SDG goals in Malaysia.

Circular Economy Project Types (indicative and non-exhaustive list)

This list of CE project types in the table below, guides the finance providers listed in Figure 2 above what constitutes an impactful circular cities project. It is helpful as a reference during the assessment stage and how it contributes to the circular economy in Malaysia. The lists below are complementary to sector specific eligibility criteria that guide the screening of CE projects and will be updated regularly in the e-guide and e-Hub to reflect developments in the different sectors.

No.	Project Types
1.	Design/production phase – circular design/input business model a) Design (incl. Research Development & Innovation (RDI)) and manufacturing of: - new products and assets for long life and/or modularity for easy maintenance, refurbishment, disassembly, repair, re-manufacturing or recycling - new materials with higher recyclability or biodegradability to eliminate single use/disposable products in particular plastics b) RDI, scale-up and deployment of key enabling process technology (including machinery, equipment) supporting circular economy projects and business models in production, use and value recovery phases (e.g., 3D printing and other advanced manufacturing technology, advanced mechanical or chemical plastic recycling technology, etc.) c) Use of secondary raw materials and chemicals recovered from waste, residues and by-products as input for new products d) Replacement of toxic, hazardous, e-waste and other substances and materials that reduce the reusability or recyclability of products and assets.
2.	Use phase – optimal use and life-extension business model a) Repair, refurbishing or remanufacturing of products and components up to generally accepted/required industry standards b) Repurposing and refurbishment of redundant assets and abandoned buildings up to generally accepted industry standards c) Decontamination/rehabilitation and redevelopment of brownfield sites d) Product-as-a-service business models incorporating circular economy principles (e.g., design for longer life, easy repair/remanufacturing, value recovery at end-of-life, water-as-a-service, circular waste water etc.) e) Product/asset sharing business models incorporating circular economy principles (e.g., Library of Things) f) Leasing/subscription business models incorporating circular economy principles
3.	After use phase – value recovery business model

	a) Take-back services for end-of-life products, components and packaging for subsequent reuse, refurbishment and recycling which supports the Extended Producer Responsibility Scheme in Malaysia b) Separate collection of recyclable waste materials and bio-waste c) Separate collection of products that can be reuse, repaired, refurbished and given to various buy-back centres across the country c) Processing of waste, residues and by-products into secondary raw materials through mechanical and/or chemical transformation processes d) Collection and subsequent recovery of inorganic and organic substances through chemical and physico-chemical processes e) Production of compost from source segregated bio-waste f) Extraction of chemicals, nutrients or other bioresources from bio-waste, organic sludge or other organic by-products and residues g) Production of standardised solid fuel (pellets or briquettes) from agricultural and forestry residues or by-products h) Production of biofuels from non-recyclable bio-waste, biomass by-products and residues (e.g., biochar from waste wood, bio-diesel from used cooking oil and animal fat, biogas and bioethanol from food and other organic waste) i) Energy recovery from non-recyclable biomass, by-products and residues (as electricity and/or heat) j) Energy recovery from biogas/landfill gas (as electricity, heat or biomethane for injection into the grid or use as vehicle fuel) k) Recovery of waste heat, e.g., from industrial processes, buildings, wastewater, etc. l) Capture, cleaning, storage and transport of carbon emissions from industrial sources in preparation for use in industrial or agricultural applications (greenhouses) m) Reuse of treated wastewater
4.	Circular support – for all business models a) Development and deployment of services (incl. ICT tools) for predictive maintenance, repair and refurbishment to extend the life of products and assets b) Development and deployment of material passports and other digital tools and applications to facilitate the traceability of waste, a national methodology applied for data collection of waste streams, marketing and trade of secondary raw materials and products for reuse, repair or recycling c) Development of apps and or e-platforms to support a Smart Circular City project that creates an ecosystem to enable all key players to thrive in designing circular solutions at city level for the benefit of the citizens

Table 1: Adapted from the EIB Circular Economy Guide to fit the Malaysian context

When you combine the above matrix in Figure 2 and Table 1 above, it will assist Malaysia to craft in one strategy canvas five main targets (regenerate, redesign, reuse, reduce & recover) for local governments to achieve as depicted in Table 2 below.

Circular Development Strategies for Local Governments

EXPECT MORE IMPACT through systems innovations ◄- - - - - - - - - - **EXPECT LESS IMPACT through incremental improvements**

	Regenerate Right from the Start	Redesign What is mine is yours	Reuse Built to last	Reduce Saving is caring	Recover Make waste history
Circularity strategy	Develop an environmentally enhancing, restorative relationship between your city and the natural system while fostering urban communities.	Encourage development of sustainable business models, sustainable product design, intensive use of product and extended ownership models.	Help to keep the materials in use by encouraging upgrades, refills, repairs, maintenance services, refurbishments, remanufacturing and repurposing.	Increase resource efficiency and reduce environmentally harmful emissions in manufacturing or use of products and services.	Support processing of materials in products to obtain the same or lower quality.
Approach & Impact	• Regenerative city development • 1.5 living concept (2000 watt society) • Eco-towns, NBS • Slow cities, regenerative agriculture • Switch to alternative low-impact materials, bio-materials	• Sharing cities • Rental - subscriptions • Leasing - subscriptions • Servitization - selling the functionality • Solutions for the base of the pyramid (leapfrogging to radi	• Design for Durability, Long Lasting and Modularity • Collection and Recycling • Repairing and Upgrading • Second-hand and Reselling • Community initiatives for reuse, incl. local workforce, disadvantaged groups in refurbishments.	• Cleaner and Resource Efficient Production • Industrial symbiosis • Zero-waste production • Toxic chemicals elimination • Health and Safety in the informal sector • Formalization of the informal sector with good environmental management practices	• Design for disassembly, reassembly and recycling • Collection and Recycling • Upcycling • Waste to energy

Table 2: Proposed by EU stakeholders on 19 August stakeholder consultation webinar

Way Forward

The initiative to dialogue with Malaysian cities was sparked by the recent initiative of the Malaysian Government to introduce a Circular Economy Roadmap (CER) for plastics by end 2020, the stakeholder consultations aims at supporting stakeholders including state governments, private sector, research and civil society *(quadruple helix)*, in taking a unified and collective approach towards a sustainable, circular economic system and an inclusive approach including the informal sector and vulnerable groups as well. The new EU Circular Economy Action Plan will serve as a basis for action in Malaysia, where the IUC project will bring best practices from the European pilot cities to achieve circular product design through, e.g. improved durability, reusability, upgradability and reparability of products; increased recycled content in products; and restricting single-use and countering premature obsolescence of products. There is an expected benefit for the European cities to access the growing market of circular economy investments in Malaysian cities.

The IUC project can also assist Malaysia and encourage integrated cross-regional cooperation with other cities in the Asian region and ideally with other world regions (South Asia, the Americas) focusing on particular strengths of each region to deliver the circular economy. It will provide the platform to work in partnership with different actors on the ground and help regional authorities with capacity building. It will strengthen cross-border and transnational cooperation programmes which are crucial to foster interregional cooperation on circular economy activities. It will do so by promoting industrial symbiosis, awareness-raising and exchange of knowledge and best practices to include innovative schemes. These exchanges include online courses within thematic networks, joint campaigns and implementing various pilot projects. In conclusion, cities in the regions will work with the European Commission, its Member States and other partners to achieve more recycling, improved waste management, resource & energy efficiency, strengthen the bio-economies, create novel solutions in product design & new business models and most importantly the creation of green jobs.