ACEBA

ASEAN Circular Economy Business Alliance

Unlocking the Circularity Opportunity: guidance to advance circular business

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SYNOPSIS AND OVERVIEW

The Circular Economy speaks to the imagination as the ambitious opposite of the linear economy in which materials are extracted from the environment, transformed into products, and disposed back into the environment at the end-of-product-life. Circular Economy has been rapidly embraced as an environmental and economic development priority, equally by governments, businesses and other organizations, in particular since the mid 2010's. Notwithstanding its broad-based endorsement, Circular Economy continues to have different interpretations for and among policy makers, businesses and other stakeholders, in turn slowing down its meaningful adoption and scaling up. To counter this situation, the ASEAN Circular Economy Business Alliance (ACEBA) developed the "*Framework for Business Action on Circular Economy in Southeast Asia*"[1], with the technical advisory of the EU SWITCH Asia Policy Support Component.

As an operationalization of this ACEBA Framework, this publication "*Unlocking the Circularity Opportunity: guidance to advance circular business*" aims to support Southeast Asian businesses with adopting Circular Economy. Firstly, this involves supporting businesses to navigate the why and what of Circular Economy. Why is Circular Economy material and relevant for business? And what does the diversity of Circular Economy concepts mean in practice for businesses? Secondly, this involves suggesting activities businesses can undertake to implement Circular Economy. How can business integrate Circular Economy into its own products and services, operations and business processes?

Circular Economy is, in principle, relevant to any business, regardless of size, age, sector, location, market and ownership structure. The guidance offered here is therefore intended to serve businesses and other organizations in their full variety. Being sector- and size-agnostic, users may need to customize the guidance to their respective business context.

This guidance document is inspired by the Circular Economy business practices[2] that were uncovered across Southeast Asia since September 2023, as part of the Technical Advisory of the EU SWITCH Asia Policy Support Component. This guidance document further builds upon a variety of good practice methodologies globally.

Chapter 1 (Doing good … and doing well) illustrates how different Southeast Asian businesses have been able to turn Circular Economy concepts into business practice. The business cases showcase direct benefit to business, in terms of reduced costs and increased productivity, new products and market access, and improved business resilience. This is accompanied by benefits to climate, nature and environment and support for the development and well-being of people and communities.

Chapter 2 (Understanding business for Circular Economy) zooms in on the different concepts and frameworks that have contributed to and continue to shape the Circular Economy. Taking together, these position the Circular Economy as a system's solution for the sustainable extraction, use and management of materials and other natural resources in production and consumption systems. This requires innovations that contribute towards circular value chains by using materials and natural resources circularly and efficiently (including through longer use) and by switching to renewable materials and energy.

1 ACEBA (2025), Framework for Business Action for the Circular Economy in Southeast Asia, ASEAN Circular Economy Business Alliance and EU SWITCH Asia, https://www.aceba.co/resource/framework-for-business-action-for-the-circular-economy-in-southeast-asia/

2 ACEBA (2024 - 2025), Circular Economy business cases from Southeast Asia, ASEAN Circular Economy Business Alliance and EU SWITCH Asia, https://www.aceba.co/business-case.

Chapter 3 (Going circular) provides operational guidance to advance circular business. It offers a menu of activities business can undertake to get more circular, divided in four functional clusters: Stocktake, Ambition, Delivery, and Integration. Recognizing that there is no single best circular business transformation process, this SADI framework offers business a chance to prioritize and customize activities for their circular business journey. Hands-on, overall guidance is provided for each activity, along with supportive analysis sheets and further references.

Chapter 4 (Circular Economy through markets) covers in brief key policy developments and business ecosystem enablers. These work in tandem with strengthening responsible and inclusive business conduct.

The guidance is meant as inspiration and tool to move forward on Circular Economy for and by Southeast Asian businesses, in partnership with their supply chains, government and the communities they operate in. ACEBA is committed to further support businesses in this endeavour through its ongoing programme of advocacy, networking and knowledge curation and sharing activities.

CHAPTER 1: DOING WELL ... AND DOING GOOD

In Southeast Asia and around the world businesses, governments and communities are taking action towards a more circular and low-carbon economy to unlock business value and benefit the environment and society. The Circular Economy aims to bring the use and wastage of materials in production and consumption systems back within the boundaries of planet Earth.

Circular Economy involves new products, services and processes, that have circularity designed-in. Firms that have picked up the circularity challenge are achieving tangible benefits – equally for their own business profitability and future-readiness as well as for the common planet and the societies upon which business depends for its success.

CIRCULAR ECONOMY

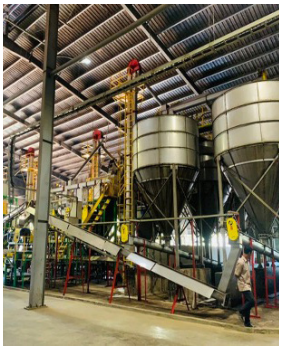
Sustainable extraction, use and end-of-life management of materials and other natural resources

Performing Well	*Doing* Good	
BUSINESS	**PLANET**	**SOCIETY**
• Lower costs for materials & other resources • New revenue opportunities • Improved business resilience	• Reduce waste & pollution • Reduce climate & other emissions • Conserve natural resources • Regenerate nature	• Create livelihoods & jobs • Improve health & well-being • Conserve skills, heritage & culture

1.1. Circular Economy for business

Business stands to benefit directly from the Circular Economy in different ways. Firstly, using materials, energy and water more efficiently, longer and repeatedly slashes business costs for procuring these and for disposing off the no-longer needed materials as waste. Secondly, supplying circular products or services opens up or expands markets using the company's core competencies, technology, designs, value chains, etc. Thirdly, pivoting into circular products, services and operations in particular for short-lived and other problematic products is a measured response for business to recognize that countries and society at large have committed to and are implementing the Circular Economy.





Fortune Parts Industries (Thailand)[3] is a producer of plastic automotive parts that has committed to transition completely to using recycled plastic pellets. In 2023, the company already used around 6,400 tonnes of recycled plastic pellets, with over 98% being recycled PP and the remainder recycled ABS. This represented 82% of its annual plastic material input, and the company is well on track towards achieving its 2027 target to use 93% recycled plastic input. In the conversion process to switch to using recycled pellets, parts are eco-re-designed for material efficiency, taking advantage of better process technology. Depending on geometry, size and performance requirements, material reductions of up to 25% have been achieved in for example the company's leading pick-up truck bumper. In a further circularity initiative Fortune Parts Industries rents out its unused moulds to other businesses, which generates a new revenue stream of around EUR84,000 annually. In 2021 the company received certification on the ZWL-DIW:2564 Standard for Zero Waste to Landfill-DIW in recognition of having achieved zero disposal of hazardous waste. In 2023, the company used 26 million MJ of bio-energy and 7.6 million MJ of solar energy, to achieve a 36% share of renewable energy in its energy use. Collectively, the energy and environment initiatives reduced the combined scope 1, 2 and 3 greenhouse gas (GHG) emissions by over 33% in 2023 (compared to 2016), whilst also achieving annual costs savings of about EUR 1.95 million through material and energy savings and avoided waste disposal costs.

Great Giant Foods[4] is the largest integrated canned pineapple company in the world and the largest banana producer in Indonesia. The business units operate in a zero-waste symbiosis; bromelain – a valuable enzyme – is recovered from pineapple stems; fruit and tapioca processing byproducts are used as animal feed; and animal manure is digested to produce bio-energy (for process use) and bio-fertilizer (for use in plantations). Rainwater is harvested in low lying areas for irrigation purposes. Precision agriculture and digitalization have helped reducing fuel and fertilizer use in farming by 40% and 30% respectively, increasing productivity by up to 50%, and reducing soil erosion. The carbon footprint of various pineapple products reduced by 24 to 63% between 2009 and 2022. The recycled content of packaging was increased to 40% for paper and cardboard, and 99.9% for steel and aluminium packaging.

Phuc Sinh Corporation[5] is a leading integrated agricultural processing and exporting company in Vietnam. To counter climate-related declines in Arabica coffee yields, Phuc Sinh set out to complement coffee farming income with the development of coffee by-products. Specifically, it set up a production facility for cascara tea, also known as coffee berry tea, from the coffee berry skins, which were previously discarded from coffee processing. The cascara tea has a distinct flavour and is well-known in Colombia and elsewhere in Latin America, with a niche but growing market globally. The cascara tea facility includes a fruit-cleaning system, peeling, UV drying, freeze drying and tea bag production and packaging. The tea flavour is highly dependent on ripeness of the berries, skin removal before the onset of post-harvest fermentation and absence of residual agrochemicals on the berries' skin. Hence coffee growers had to switch to manual and selective berry picking and adoption of low chemical input cultivation practices. Phuc Sinh was able to create an additional, new revenue stream and rewarded growers with a better price for supplying quality coffee berries that are suitable for both coffee and cascara production.

Pico Sands Hotel and Pico de Loro Beach and Country Club[6] is a 40-hectare leisure property in the Philippines. In 2018, the hotel embarked on '*Sustainable Diner*' concept to reduce food wastage, through a food-waste management system covering pre-service (back-of-the-house) operations and dining operations. For example, better planning and inventory management ensured less spoilage and better quality of food and beverage ingredients. New uses were found for previously discharged waste, such as turning pineapple scraps into jam and using seeds from fruits and vegetables to propagate seedlings for the gardens. In the buffet stations, bread and pastries are prepared in smaller portions to discourage leftovers. By 2023, food waste had reduced to 111 grams per guest, compared to 350-400 grams prior to the programme, and yielded cumulative savings of around EUR125,000 on food purchases during 2019-23. The remaining food waste is composted using the Bokashi fermentation composting system, with the compost used in the onsite vegetable gardens. Refusal

3 Fortune Parts Industries: Design and Manufacturing of Recycled Plastic Automotive Parts, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/design-and-manufacturing-of-recycled-plastic-automotive-parts/

4 Great Giant Foods: Integrated Operations for Sustainable Agriculture, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/integrated-operations-for-sustainable-agriculture/

5 Phuc Sinh Corporation: Premium Cascara Tea from Previously Discarded Coffee, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/premium-cascara-tea-from-previously-discarded-coffee-waste/

6 Pico Sands Hotel and Pico de Loro Beach and Country Club, Sustainable Resort Operations, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/sustainable-resort-operations/

and substitution of single-use plastics, avoided approximately one metric tonne of plastic waste in 2023. The latter was achieved through avoidance and/or substitution of 93,000 plastic water bottles and 10,000 plastic shampoo bottles, 54,500 plastic coffee stirrers, 64,000 plastic tooth brushes, 32,000 plastic bin liners, 720 plastic laundry bags and 141 plastic décor sets. Water efficiency and leak prevention, along with use of onsite treated effluent for irrigation purposes, reduced water consumption by 36%. A building management system (BMS) was set up to improve lighting, air conditioning and other controls to conserve energy. This was complemented with energy-efficiency upgrades, including conversion to LED lights and inverter-type air conditioning, and installation of high-sensitivity motion sensors in rooms and common areas. This achieved cumulative energy savings worth EUR255,000 during 2019-23.

Renewcell[7] (Malaysia) has specialized in the rejuvenation, monitoring and management of lead-acid and nickel-cadmium batteries used in industrial applications such as forklifts, buggies, uninterruptible power systems (UPS), solar installations, and trains. The company uses an advanced electronic rejuvenation process to break down the lead sulfates which are formed during consecutive battery charging and discharging cycles and reduce the efficiency and capacity of successive battery charging and discharging cycles. This is combined with advanced battery monitoring and maintenance systems, with application of Internet of Things. This extends the lifetime of batteries twofold (for batteries used in mobile applications) to threefold (for stationary batteries) by preventing overcharging, over-discharging and heat stress. This further optimizes the energy efficiency in the energy storage, and minimizes losses of stored energy.

1.2. Circular Economy for the planet

> *The future of undeniable and irreversible climate change, loss of nature and biodiversity, and widespread pollution has already arrived. There is no pause button - and their negative impacts on livelihoods, society, economy and business are on the rise. Ignoring these signs is a risky business affair. The world needs innovative, circular product, service and technology solutions to bring down materials use as the root cause of the climate, nature and pollution crises - and business is in the driving seat to provide such circular innovations.*


Holcim Philippines[8] operates four cement manufacturing plants, an aggregates business and a network of distributors throughout the country. In 2022, the Holcim plants used 941,000 metric tonnes of biomass and municipal and industrial wastes (e.g. pet coke from refineries) as alternative fuel, which reduced coal and other fossil fuels by 8% compared to 2021, equivalent to over 3,200 GJ. In 2022, industrial wastes such as fly ash and slag constituted 11% of the raw materials used for cement production, substituting the use of quarried limestone, silica and shale. Combined with energy efficiency measures, this reduced CO_2 emissions per metric tonne of cementitious product by 7% in 2022 compared to 2021. Simultaneously freshwater withdrawal was halved through rainwater harvesting, stormwater management, automation of water systems and regular maintenance to prevent leakages. These and related efficiency and digitalization initiatives generate annual operation cost savings exceeding EUR 22 million, whilst also significantly increasing production capacity.

7 Renewcell: Battery Rejuvenation for Circularity and Energy Efficiency in Energy Storage, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/battery-rejuvenation-for-circularity-and-energy-eficiency-in-energy-storage/

8 Holcim Philippines: Decarbonising Cement through Efficiency and Alternative Fuels and Materials, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/decarbonizing-cement-through-efficiency-and-alternative-fuels-and-materials/

Robries[9] collects, sorts, cleans and recycles source-segregated plastic waste from waste banks, scavengers and business partners in East Java, Indonesia. The company has specialized in recycling polypropylene (PP), low-density polyethylene (LDPE) and high-density polyethylene (HDPE) which involves shredding, sorting by material type and colour and hot pressing into recycled polymer sheets. These sheets are transformed into high quality, aesthetically-refined and functional durable consumer goods like home décor, furniture items, shoe soles and watch belts, that are regularly featured at design exhibitions. The company's revenue increased 20-fold in first 5-years since starting up in 2019. By the end of 2023 it had turned a total of 110 tonnes of plastic waste into durable consumer products, thereby not only diverting plastic waste from landfill or indiscriminate disposal, but also substituting virgin plastics use and avoided the environmental impacts otherwise caused by such virgin plastic production. The success of Robries is largely attributed to design excellence, innovation and partnerships – both with renowned designers as well as businesses, including coffee shops that serve equally as suppliers of plastic waste and as users of recycled plastic furniture and décor.

Saeng Charoen Grand[10], Thailand, started off as a business venture to repurpose used clothes. Since 2020 it has evolved progressively into a business specialising in the mechanical recycling of all types of textile wastes, including discarded fashion and workwear and pre-consumer textile industry waste, to make new fabrics suitable for garments and home-textiles. This involves sorting of shredded fabric and yarn by their physical properties, material and colour, to produce recycled fabric that retains the original colours and thus avoids pollution otherwise occurring from the re-dyeing of recycled fabric. The textile recycling diverts the disposal of textile waste and by-passes the production of new fabrics, which avoids resource use and environmental impact in both textile waste disposal and production of virgin textile fabrics. A commissioned comprehensive Life Cycle Assessment (LCA) confirmed that with monthly recycling having reached 400 tonnes at the end of 2023, annual water use and waste water reduction reaches nearly 2.1 million m^3, and annual GHG emission reduction exceeds 18,000 tons CO_2, compared to using virgin yarn and fabric. SC Grand works extensively with designers, manufacturers and users of garments and home textiles to create recycled textile products, including circular staff uniforms, supplying recycled fabric to local-brand clothing factories, customising circular fabrics to meet the demands of brand designers and co-creating SC Grand-branded home textiles and sustainable living collections.

Wijaya Karya Bangunan Gedung (WEGE)[11] (Indonesia) is specialised in prefabricated, prefinished volumetric construction (PPVC) – a construction method by which free-standing three-dimensional modules are completed with internal finishes, fixtures and fittings in an off-site fabrication facility, before being delivered and installed on-site. This method is modular in that it deploys standardised modules into a larger building. The modules are prefabricated at an industrial facility with higher efficiency and quality and less waste. Modular buildings can be fully disassembled, moved and reassembled at another location for the same or a different purpose, which is particularly useful for buildings with a short expected useful lifetime. Compared to conventional construction, depending on size and design features, modular construction saves significantly on the use of raw materials (i.e. steel, concrete, cement, bricks), reduces greenhouse gas (GHG) emissions, and minimises waste at the construction site. This was illustrated with the COVID19 hospital in Jakarta that was built with 85% lower material weight than conventional construction, allowing a further 1/3rd reduction of concrete use for its foundations. The building has since been disassembled, shipped to Kalimantan and re-assembled for a second use as workers' hostel.

Husk Ventures[12] in Cambodia converts rice husk, a byproduct from rice milling, into biochar through pyrolysis to achieve environmental and agronomic benefits. During production, biochar converts previously wasted rice husk and locks in its carbon content, and during its subsequent use biochar enhances soil health and contributes to retain water and nutrients. Moreover, the pyrolysis produces a natural insect repellent that replaces chemical repellents. Agricultural yields improve by 10-70% with the use of biochar, whilst reducing costs for chemical fertilizers and pesticides by up to 60%. The verified carbon sequestration is traded as a

9 Robries: Unique Recycled Plastic Home Decor, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/unique-recycled-plastic-home-decor/

10 Saeng Charoen Grand: Turning Fabric Waste into New Fabric, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/turning-fabric-waste-into-new-fabric-and-garments/

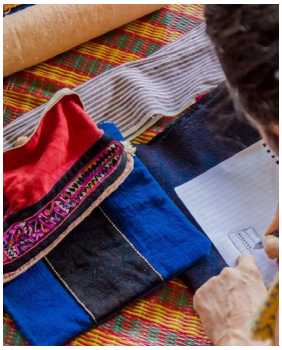
11 Wijaya Karya Bangunan Gedung (WEGE): Modular: Future for Sustainable Construction, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/modular-future-for-sustainable-construction/

12 Husk Ventures: Biochar Innovation in Agriculture, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/biochar-innovation-in-agriculture/

carbon credit, which improves affordability of the biochar to farmers. The improved soil health and reduced reliance on agricultural chemicals are beneficial to conservation of nature and biodiversity in and near the farming areas.

1.3. Circular Economy for society

> *Addressing materials use as the root cause of planetary change, benefits the economy and society at large by lessening the burden, including health and well-being impacts and mitigation and adaptation costs, posed by climate change, loss of nature and biodiversity, and accumulation of pollution. Beyond these macro-level societal benefits of the Circular Economy, firms can through their circularity initiatives create immediate improvements in the lives of the people and societies they work with. This may involve: creation of jobs and/or livelihoods; conservation of crafts, heritage and a healthy living environment; and development of livelihood-improving products for the poor and disadvantaged.*


Reztyle[13] established a textile waste collection, sorting and sewing centre in the Philippines to recover and directly repurpose discarded clothing, linen and other textiles into different products. This involves manual sorting and cutting out of reusable fabric pieces that are then sanitised and stitched into different types of textile items, either a garment, accessory or functional cloth item like reusable (shopping) eco-bags, aprons, bibs or fashion for pets. Seamstresses stitch recovered fabric pieces together following prototype designs for different product offerings, which are then quality controlled. Given the diversity in recovered fabric, each product is unique. Reztyle turns pieces that are unfit for repurposing as textile item into stuffing for toys and furniture. The remaining leftover cloth pieces are then supplied to Green Antz Builders, which mixes them with plastic waste to produce eco-boards that can replace plywood or particle boards in office cubicles, table tops and other applications. Reztyle recovered 8.5 tonnes post-consumer textile waste in 2023, while creating direct employment for 12 seamstresses. Reztyle is serving as an inspiration to replicate and scale-up and is now supporting government and other stakeholders to establish a network of cooperative community sewing centres that provide livelihood opportunities in particular for marginalized women in different locations in the Philippines.

Ock Pop Tok[14] (which stands for East meets West in Laotian) is a social enterprise for and by women in Luang Prabang with a mission to preserve and promote Laotian textiles, food and culture. It collects old traditional textiles, such as wedding blankets, and repurposes these into new products like wall decorations and bags. As an alternative for the silver coins that often adorn traditional Lao textiles, Ock Pop Tok worked with Akha artisans in northern Laos to upcycle aluminium cans to make sparkling discs and incorporate these in affordable textile items particularly souvenir items. Another initiative recovers traditional natural dyeing techniques and improves the quality of dyeing to meet today's consumer expectations. The premises of Ock Top Pop have been turned into a tourist destination of its own with a restaurant and overnight accommodation, shop and weaving activities for tourists. An onsite biogas plant turns the kitchen waste into biogas that is used for cooking, and garden and other organic waste is composted for onsite use as substitute for chemical fertilizers.

13 Reztyle: Repurposing Garment and Textile Waste, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/repurposing-garment-and-textile-waste/

14 Ock Pop Top: Materials Recovery in Handicraft Textiles, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/materials-recovery-in-handicraft-textiles/

M Treasure (Myanmar)[15] produces an alternative to plastic packaging from the sheaths of areca nut palm (Areca catechu). The sheaths are washed, dried and hot-moulded into packaging, that is used by over 500 domestic food businesses. This biodegradable packaging is fully compostable, and using its compost can improve soil quality, reduce dependence on synthetic fertilisers and minimise energy use and waste generation. M Treasure works with farming communities to collect and supply the naturally-shed areca leaf sheaths, which would otherwise be left to decompose. M Treasure thus fosters environmental stewardship and contributes to local livelihoods.

Sai Yok Springs[16] was set up in Thailand to develop a low carbon and plastic free alternative to imported premium mineral water. The company identified and developed a natural source of premium mineral water in Thailand, and supplies this in refillable glass bottles, while encouraging bottle collection through its proprietary deposit-and-take-back system. The company thereby offers a local, sustainably-sourced, and circular-packaged alternative for imported premium mineral water in the hospitality sector. The bottling plant runs for 80% on renewable energy and combined with avoidance of intercontinental transport, achieves a 91% reduction of carbon footprint of bottled premium mineral water, compared to imported water from Europe. The bottling plant provides employment for the local ethnic community. The company supports the community to protect the water source from contamination during the rainy season, and has agreed to limit water usage from the spring and extract water only during night hours to minimize impact on daily lives in the community.

ACE[17] (Cambodia) is addressing the twin problems of indoor air pollution and deforestation resulting from biomass use in traditional cooking stoves. Increasing efficiency and reducing indoor air pollution is possible with modern stove designs operating with a fan, putting it out of reach for households without a grid connection. ACE therefore developed an integrated energy solution, built around a forced-air gasifier cookstove made from stainless steel, with a small solar panel and battery to power its fan. This created the added benefit of a charging solution for a LED lantern and mobile phone. The system reduces smoke by 90%, improves fuel efficiency by 50% and is safer to operate, reducing the burden on women and children in terms of air pollution exposure and firewood collection effort. To further reduce deforestation the company started to produce briquettes from sugar cane waste. Moreover, ACE is providing its cooking system on a pay-by-use basis to overcome the affordability problem, given its significantly higher upfront price relative to other, inefficient stoves available in the local market.

15 M Treasure: Areca Nut Palm Sheaths as a Biodegradable Plastic Packaging Alternative, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2025, https://www.aceba.co/resource/areca-nut-palm-sheaths-as-a-biodegradable-plastic-packaging-alternative/

16 Sai Yok Springs: Domestic Premium Mineral Water in Refillable Bottles, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/domestic-premium-mineral-water-in-refillable-bottles/

17 Africa Clean Energy (ACE): Revolutionizing Clean Cooking in Cambodia, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/revolutionising-clean-cooking-in-cambodia/

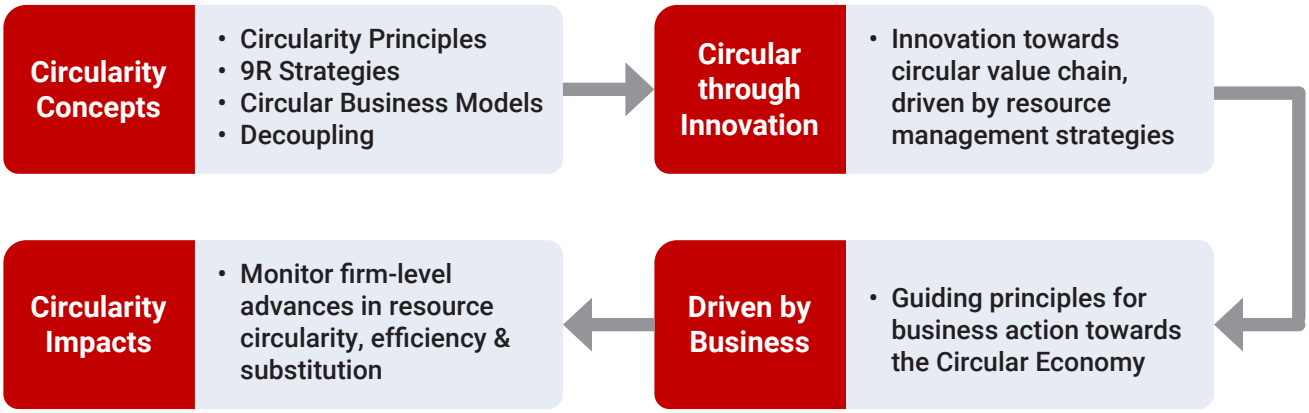
By focusing on the use of materials and other resources in production and consumption systems, Circular Economy provides a lens to unlock business opportunities.

These can deliver direct benefit to the company through cost reduction and market development, and simultaneously do good for planet and society.

CHAPTER 2: UNDERSTANDING BUSINESS FOR THE CIRCULAR ECONOMY

Circular Economy speaks to the imagination as the ambitious opposite of a linear economy that takes materials from nature, makes and uses these materials in products, and discards products at their end-of-life as waste. This invokes the guiding idea of closed loop material use that has been operationalized from different environment, natural resources, business and policy perspectives into a diversity of Circular Economy concepts. None of these is unique nor on its own sufficient to achieve circularity in full, rather all can be seen as supporting a circular transformation of business and the economy, or a circularizing economy. This takes shape through new, circular products, services and processes, developed and delivered by business. Making sense of the ambition, concepts, guiding principles and metrics for Circular Economy, helps business to navigate the circular business future.

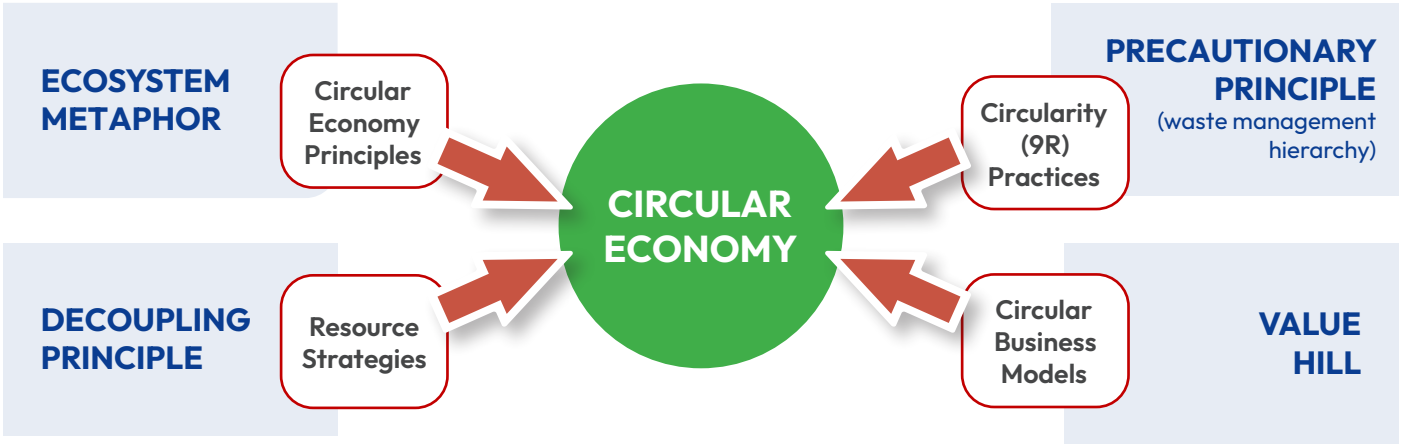
UNDERSTANDING BUSINESS FOR THE CIRCULAR ECONOMY:
FROM CIRCULAR ECONOMY CONCEPT TO IMPACT



2.1. Contributing perspectives

At present, there is no single, commonly-accepted interpretation and operationalization of Circular Economy. This poses a challenge for taking action and feeds scepticism among policy makers, businesses and stakeholders. It also provides a breeding ground for different shades of greenwashing. The current diversity of Circular Economy concepts is a reflection of the different schools of thought that seeded the Circular Economy concepts and its practice (as in Figure 1). First, an ecosystem metaphor that applies the material flow principles observed in nature into industrial systems. Second, the established waste management hierarchy based on 3Rs (Reduce, Reuse, Recycle) has expanded to a Circular Economy hierarchy based on expanding sets of R-practices. Third, Circular Economy retains the economic value of products and components, particularly at the end of their life, calling for circular business models that slow, narrow, close or regenerate the use of materials. Fourth, Circular Economy is the practical way to decouple the economy and well-being from natural resource use and associated environmental impacts.

Figure 1: Circular Economy: contributing perspectives



The ecosystem metaphor

Nature operates through circular processes which avoid that anything goes to waste and ensure nature and its productive capacity are continuously regenerated. Using this as metaphor, Circular Economy is "*characterised, more than defined, as an economy that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility at all times, distinguishing between technical and biological cycles*" [18]. The technical cycles deal with '*stocks*' of finite materials (metals, building materials, etc.) that are '*restored*' and cycled within closed technical cycles inside the economy, whereas the biological cycles deal with '*flows*' of renewable materials which are mostly *'regenerated'* through naturally occurring biological processes. The further operationalization involves three Circular Economy principles, respectively: (1) *eliminate waste and pollution;* (2) *circulate products and materials* (at their highest value); (3) *regenerate nature*. Table 1 provides Southeast Asian business cases as illustration.

Table 1: Practical illustrations for the Circular Economy principles

Principle	Objective[19]	Southeast Asian Example[20]
Eliminate waste and pollution 	Foster system effectiveness by revealing and designing out negative externalities.	Basey Association for Native Industry Growth (Philippines) eliminated tikog-grass waste from matt-weaving by improving cultivation and drying techniques, and developing new products based on weaving of short length grass (which previously had to be discarded).
Circulate products and materials 	Optimize resource yields by circulating products, components, and materials at their highest available utility at all times in both technical and biological cycles.	Chandra Asri Group (Indonesia) circulates waste plastic materials (a technical material) in asphalt to improve road durability (and thus useful lifetime) and for pyrolysis to produce an alternative fuel. Pinmisa (Thailand) extracts hyaluronic acid from fish-bone waste (a biological material) to produce ingredients for cosmetic products.
Regenerate nature 	Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows.	Loc Troi Group (Vietnam) applies sustainable rice cultivation practices that regenerate soil health, improve soil quality and reduce climate emissions and fertilizer use with better agronomic practices and improved crop residue management.

18 EMF (2015), Towards a circular economy: business rationale for an accelerated transition, Ellen MacArthur Foundation, https://www.ellenmacarthurfoundation.org/towards-a-circular-economy-business-rationale-for-an-accelerated-transition

19 EMF (2015), Towards a circular economy: business rationale for an accelerated transition, Ellen MacArthur Foundation, https://www.ellenmacarthurfoundation.org/towards-a-circular-economy-business-rationale-for-an-accelerated-transition

20 All business examples taken from SWITCH Asia & ACEBA collection, accessible from: https://www.aceba.co/aceba/business-case/

An (extended) waste management hierarchy

The old saying that '*an ounce of prevention is worth more than a pound of cure*' is reflected in the widely-accepted waste management hierarchy, commonly known as 3R: Reduce, Reuse and Recycle. This is a reflection of the precautionary principle, that aims to avoid (environment and related) risks in case of uncertainties on potential impacts.

The Circular Economy can be seen as a further application and extension of the 3Rs, which allows for more granularity in specific recovery options for end-of-life products, components and parts. While several different and competing variations exist, some consolidation is being observed into the 10 strategies of the so-called 9R framework[21]: Refuse; Rethink; Reduce; Reuse; Repair; Refurbish; Remanufacture; Repurpose; Recycle; and Recover[22]. Slightly different sets exist elsewhere, for example excluding Rethink and adding Remine[23]. Specific definitions of these R strategies are scarce and often left implicit or considered intuitively understood. Table 2 provides one set of definitions that are framed from the perspective of end-of-life products, or post-consumer waste avoidance, yet are more commonly applicable for all waste streams (including associated water and energy flows). Each is illustrated with a practical example from Southeast Asia.

Table 2 Practical illustrations for the 9R Circular Economy practices

R-Practice	Objective[24]	Southeast Asian example[25]
Category 1: Smarter product use and manufacture		
R0: Refuse	Make product redundant by abandoning its function or by offering the same function with a radically different product.	Sivatel Boutique Hotel (Thailand) refuses single use plastic products and eliminated plastic drink bottles and shampoo and soap containers using dispensers and replaced plastic straws with biodegradable alternatives.
R1: Rethink	Make product use more intensive (e.g. through sharing products or by putting multifunctional products on the market).	Lotus Silk Farm by Samatoa (Cambodia) rethought lotus flower cultivation by re-developing lotus-silk and lotus-leather-like products, which turn previously discarded lotus stems into premium products using traditional crafts and modern design, and diversified lotus farming into a tourism experience, offering lotus-plantation boat tours, workshops, cafe and lotus-based confectionary and wellness products.
R3: Reduce	Increase efficiency in product manufacture or by consuming fewer natural resources and materials.	Advance Prefab Company (Thailand) produces precast sandwich wall panels which reduce concrete use by 48% compared to solid wall panels and its improved thermal insulation reduces energy consumption during use of the buildings.
Category 2: Increase lifespan of product and its parts		
R3: Reuse	Re-use by another consumer of discarded product which is still in good condition and fulfils its original function.	Unilever (Indonesia) introduced refillable packaging for some of its liquid products allowing customers to continue to reuse the product's containers (dispensers).
R4: Repair	Repair and maintenance of defective product so that it can be used with its original function.	Philux (Philippines) offers lifelong repair and re-upholstery services for its design furniture, significantly increasing their useful lifetime.

21 The framework is commonly known as 9R framework, notwithstanding it actually covers 10 strategies, numbered R0 to R9.
22 Potting, J, Hekkert, M Worell, E and Hanemaaijer, A (2017), Circular Economy: measuring innovation in the product chain, PBL Netherlands Environment Assessment Agency, https://www.pbl.nl/downloads/pbl-2016-circular-economy-measuring-innovation-in-product-chains-2544pdf
23 Reike, D. et al (2018). The Circular Economy; new or refurbished as CE 3.0 - exploring controversies in the conceptualization of the circular economy through a focus on history and value retention options in Resources, Conservation & Recycling, 246-264.
24 Potting, J, Hekkert, M Worell, E and Hanemaaijer, A (2017), Circular Economy: measuring innovation in the product chain, PBL Netherlands Environment Assessment Agency, https://www.pbl.nl/downloads/pbl-2016-circular-economy-measuring-innovation-in-product-chains-2544pdf
25 All business examples taken from SWITCH Asia & ACEBA collection, accessible from: https://www.aceba.co/aceba/business-case/

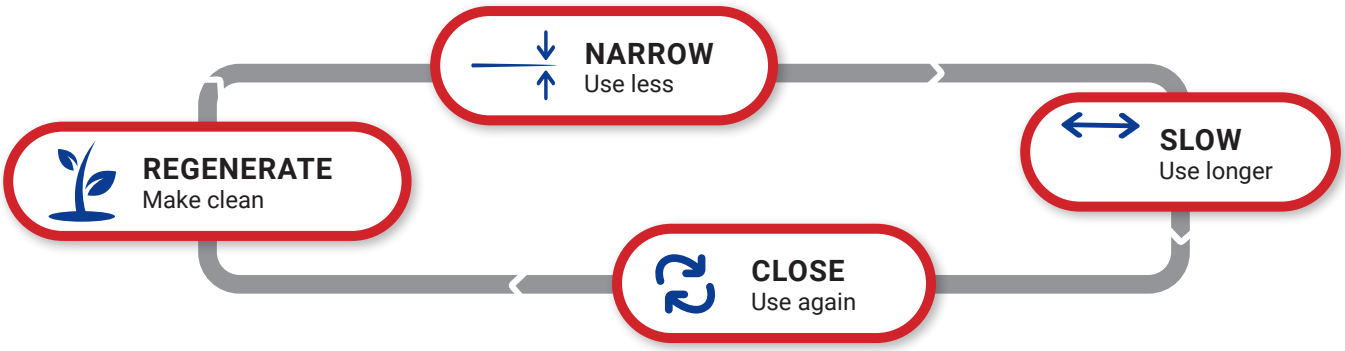
R-Practice	Objective[24]	Southeast Asian example[25]
R5: Refurbish	Restore an old product and bring it up to date.	Converge ICT (Philippines) collects and refurbishes customer modems, power cables and patch cords and supplies these to new customers for another use cycle.
R6: Remanufacture	Use parts of discarded product in a new product with the same function.	Smateria (Cambodia) transforms clear plastic industrial packaging bag waste into a leather-like plastic material for stylish bags and accessories.
R7: Repurpose	Use discarded product or its parts in a new product with a different function.	Moreloop (Thailand) facilitates recovery of unwanted surplus fabric from garment industry (pre-consumer waste) for repurposing in the manufacturing of garments and/or other textile items by other companies.
Category 3: Useful application of materials		
R8: Recycle	Process materials to obtain the same (high grade) or lower (low grade) quality	Precious Plastics (Philippines) collects post-consumer plastic waste and mechanically recycles this into plastic board material for production of furniture and household utensils and decorations.
R9: Recover	Incineration of materials with energy recovery	Solusi Bangun Indonesia (Indonesia) biomechanically processes municipal solid waste to produce a Refuse Derived Fuel (RDF) that is used as alternative fuel in its cement kilns.

Circular business models

The circular business models are concerned with the economic and other values of materials to business and other stakeholders. In a linear economy, the economic value of materials increases as materials move from extraction, to processing, parts manufacturing and product assembly, reaching their peak during product use, and then dropping instantly once the used product is discarded; a notional '*value hill*' with value creation leading to product use and value destruction after use[26].

In a Circular Economy, materials value is retained or recreated, which requires a change in the way businesses provide goods and services and generate cash flows or earnings, hence at the core of their business model. The circular business models functionally aim to narrow (use less), slow (use longer), close (use again) and regenerate (make clean) material and energy flows[27]. As illustrated in Figure 2, these can be further supported by informational strategies – using data of materials, products and waste flows and qualities to facilitate the circularity of material flows. Table 3 provides practical examples. Alternative taxonomies for circular investments are based on type of business activities, e.g. circular design; optimal use; value recovery; and circular support models.[28]

Figure 2: Circular Business Models: narrow, slow, close and regenerate material and energy flows[29]



26 Achterberg, E. et al (2016), Master circular business with the value hill, Circle Economy, Amsterdam, https://cdn.prod.website-files.com/5d26d80e8836af2d12ed1269/5dea74fe88e8a5c63e2c7121_finance-white-paper-20160923.pdf

27 Konietsko, J, Bocken, N and Hultink, E.J (2020), Circular ecosystem innovation: an initial set of principles, in Journal of Cleaner Production, https://doi.org/10.1016/j.jclepro.2019.119942

28 EU (2020), Categorisation System for the Circular Economy: a sector agnostic approach for activities contributing to the Circular Economy, European Union, Brussels, https://op.europa.eu/en/publication-detail/-/publication/ca9846a8-6289-11ea-b735-01aa75ed71a1

29 Based on: Konietsko, J, Bocken, N and Hultink, E.J (2020), Circular ecosystem innovation: an initial set of principles, in Journal of Cleaner Production, https://doi.org/10.1016/j.jclepro.2019.119942

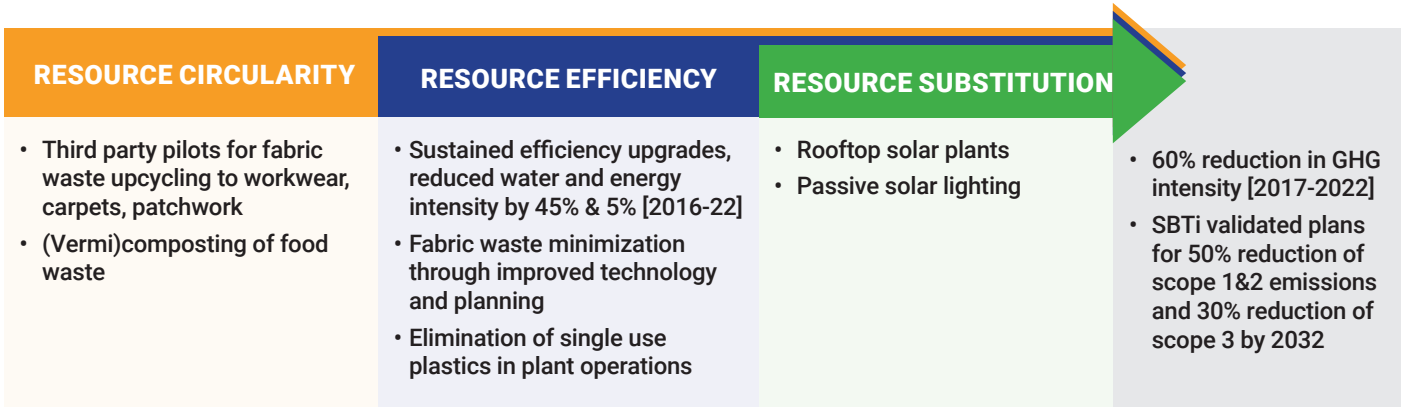
Table 3: Practical illustrations for the circular business model strategies

Business Model Strategy	Objective[30]	Southeast Asian example[31]
1. **Narrow**	Use less materials and energy.	Electrum (Indonesia) lightweighted the battery system of its EV scooters to save energy and costs and improve their operability, and compensated for resulting short range with a battery swapping system supplied through a dense urban distribution network.
2. **Slow**	Use products and components longer.	Thai Wacoal (Thailand) redesigned bra-products to incorporate recycled polyester and nylon and improve useful life, including through provision of use and care instructions to buyers.
3. **Close**	Use products, components and materials again.	Norn-Norn (Thailand) supplies high quality mattresses through a subscription service (product-as-a service model) to ensure recovery of mattresses at the end of their use for effective reuse and/or recycling.
4. **Regenerate**	Use non-toxic material, renewable energy and regenerate natural systems	Fair Farms (Cambodia) introduced a cover crop in its pepper farm, started vanilla intercropping and uses organic fertilizers to rejuvenate the soil and to minimize erosion and irrigation requirements.
5. **Inform**	Use information to facilitate the narrowing, slowing, closing and/or regenerating of material loops.	Recycoex (Thailand) operates an online platform for picking up source-segregated recyclable waste at the doorstep of businesses and other organizations for aggregation and onward supply to specialized recyclers.

Resource and impact decoupling

The escalating and unsustainable levels of extraction and use of material resources is the leading root cause of today's climate, nature and pollution crises. It is therefore necessary to decouple the provision of goods and services from increased resource use and environmental impacts; put differently: *"produce more (products) with less (resources and impacts) for more (wellbeing)*'. Circular Economy is the operationalization of this decoupling principle. It physically changes the use of materials, water, energy and other natural resources throughout successive lifecycles of products, services and technologies. These changes may aim for: resource circularity (keeping materials and other resources in perpetual recovery and recycling loops); resource efficiency (endlessly practicing efficiency and expanding longevity in the use of all natural resources); and/or resource substitution (maximising the use of sustainably-sourced renewable materials and energy)[32]. Applied to business activities, these resource strategies are truly complementary and offer synergistic opportunity as illustrated in Figure 3.

Figure 3: Illustration of synergies between resource strategies at Pan Brothers (Indonesia) [33]



30 Konietsko, J, Bocken, N and Hultink, E.J (2020), Circular ecosystem innovation: an initial set of principles, in Journal of Cleaner Production, https://doi.org/10.1016/j.jclepro.2019.119942

31 All business examples taken from SWITCH Asia & ACEBA collection, accessible from: https://www.aceba.co/aceba/business-case/

32 Van Berkel, R. and Fadeeva, Z (2020), Role of Industries in Resource Efficiency and Circular Economy, in Gosh, S.K (ed), Waste Management as Economic Industry Towards Circular Economy, p9 171-183, Springer Publishers, Singapore.

33 Pan Brothers: Operationalizing circularity towards net zero garment making, SWITCH-Asia and ASEAN Circular Economy Business Alliance, 2024, https://www.aceba.co/resource/operationalising-circularity-towards-net-zero-garment-making/

Combining these different perspectives, Circular Economy emerges as a system's solution to the use of – *virgin* - materials and other natural resources and the discharge of – *wasted* – materials and other natural resources, with a view to bring both net inflows and net outflows into and from the economy and society as close as possible to zero. This system's perspective is consistent with the terminology provided in the ISO59004 Guidance Standard on Circular Economy[34]. However, even with this standardization diverse and part-competing interpretations of Circular Economy are likely to continue into the future.

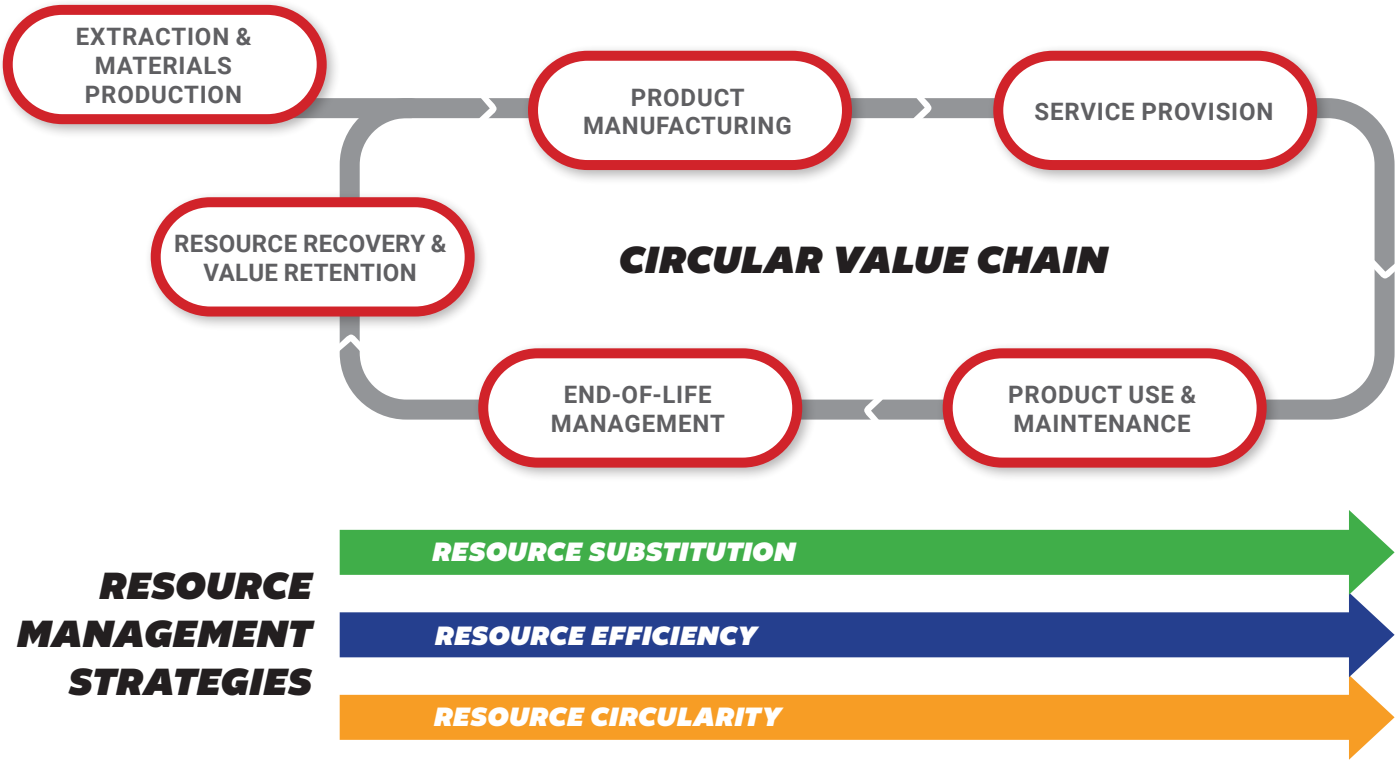
2.2 Innovation space

> *Approaching Circular Economy as a framework for the sustainable management of all natural resources, positions Circular Economy as an open-ended innovation space of operational or technical circular solutions (for products, services, technologies, business models, etc). This reflects that Circular Economy offers guidance for circular innovation, and is not a prescriptive set of pre-defined solutions that need to be re-engineered in existing – linear – products, services and systems.*

A common element of the different frameworks is the reliance on 'new' products, services or technologies that improve the sustainable use of materials and other resources: or – in other words – Circular Economy is the result of innovation towards sustainable materials and resource use, or, in short, circular value chains. This innovation can take different forms (as also illustrated by the business examples) and appears open-ended, just constrained by the ability to '*think outside of the box*'.

The open-ended circular innovation space has two dimensions, namely the circular value chain and the resource management strategies. This is visualized in Figure 4: the circle has the successive key stages in the circular use of materials and other resources that form the circular value chain, and the horizontal arrows show the resource management strategies that apply to each value chain stage. Table 4 provides working descriptions of these circular stages and the resource management strategies, along with an illustrative, non-limitative application for the case of denim wear.

Figure 4: Circular Economy: resource management strategies driving innovation to achieve circular value chain.



34 ISO. 2024. ISO 59004: Circular economy: vocabulary, principles and guidance for implementation, International Organisation for Standardisation

Table 4: Category descriptions for circular innovation space.

Category	Element	Description	Application for denim wear (non-exhaustive list, for illustration only)
Resource Management Strategy	**Resource Circularity**	Keeping materials and other natural resources in continued use through the recovery and repeat application of previously discarded materials, water and/or energy.	Incorporation of – pre- and/or post – consumer recycled yarn in denim fabric.
	Resource Efficiency	Using materials and other natural resources (including energy, water and others) more efficiently, including using these more intensively and/or for an extended useful period of time.	Optimization of pattern laying to reduce cutting fabric waste from garment making.
	Resource Substitution	Substituting a non-renewable (fossil- or mineral-based) material and/or energy by a renewable alternative.	Switch to organic cotton &/or dyeing with organic dyes.
Circular Value Chain Stage	**Extraction & Materials Production**	The production of primary (also '*virgin*') materials as inputs for product manufacturing and/or service provision, including extraction, mining, agriculture, forestry and fisheries and associated primary materials production.	Cotton farming, harvesting and ginning, and chemical production of elastane fibre.
	Product Manufacturing	The design and manufacturing of products, including its parts, components and packaging.	Spinning, weaving, dyeing & finishing and garment making, including production of accessories (zippers, buttons, etc.).
	Service Provision	The provision of services (e.g. hospitality, health, logistics, education, business support etc.), including the sourcing of the products consumed for and during the service provision.	Institutional use of denim as workwear, uniforms, etc, including laundering, repair and other care.
	(Product) Use & Maintenance	The use of products, including all activities needed for their continued, efficient and effective utilization, such as servicing, cleaning, repairing, etc., as required.	Personal use of denim clothing, including laundering, repair and other care.
	End-of-Life Management	The segregation, collection and sorting of post-consumer waste of discarded products (and/or its consumables, parts and/or packaging) and of pre-consumer waste of discarded materials, water and/or energy generated during extraction, materials production, product manufacturing and/or service provision, and logistics and distribution.	Disposal of end-of-life denim wear and collection through mixed municipal or commercial waste or as source-segregated textile waste.
	Resource Recovery & Value Retention	The conversion of end-of-life parts, material, water and/or energy resources into valuable secondary inputs and their application in any of the preceding stages of the same or any other circular value chain.	Repurposing of fabric parts in textile products (patchwork, bags, rugs), mechanical recycling into textile yarn/fabric, and recovery and recycling of metals (zippers, buttons, etc.)

Figure 5: Circular solutions canvas illustrated with some generic solutions.

<table>
<tr><th></th><th>Extraction and material Processing</th><th>Product Manufacturing</th><th>Service Provision</th><th>Product Use & Maintenance</th><th>End of Life Management</th><th>Resource Recovery & Value Retention</th></tr>
<tr><td rowspan="2">Resource Circularity</td><td colspan="6">• Recover & reuse of waste energy & waste water in all activities.</td></tr>
<tr><td>• Secondary processing of by-products for extraction or production of a second valuable material.</td><td>• Eco-design products & packaging from secondary materials &/or for repair, reuse, recycling &/or recovery.
• Switch to use of secondary resources in operations (industrial symbiosis).</td><td>• Use of reusable distribution packaging in logistic services.
• Switch from single use to reusable cutlery & packaging in food & beverage services.</td><td>• Direct reuse of products by successive users (through e.g. second-hand shop, deposit system or renting or leasing systems).</td><td>• Source segregation to improve efficiency, recovery rate & quality in resource recovery.</td><td>• Repurpose, refurbish &/or remanufacture products &/or their components for a new use cycle.
• Recover materials &/or energy from end-of-life products &/or other wastes.</td></tr>
<tr><td rowspan="3">Resource Efficiency</td><td colspan="6">• Apply material, energy & water efficient methods & techniques in all activities.</td></tr>
<tr><td rowspan="2">• Improve agronomy & use big weather, soil & crop data to reduce fertilizer, pesticide & irrigation needs & reduce post-harvest losses.</td><td rowspan="2">• Eco-design products & packaging for reduced weight &/or volume & for efficiency & longevity in use.</td><td>• Switch to ‘products as a service’ business models to improve affordability of more durable & efficient products.</td><td>• Service, maintain &/or repair products for extending their useful life.</td><td>• Integrate reverse logistics for efficiency in end-of-life product collection.</td><td rowspan="2">• Application of advanced sensors & sorting techniques to increase recovery rate & improve quality/purity of recovered materials.</td></tr>
<tr><td colspan="3">• Intensify, diversify, extend &/or reduce product use with sustainable consumption and sustainable lifestyle changes.</td></tr>
<tr><td rowspan="3">Resource Substitution</td><td colspan="6">• Use available renewable energy in all activities (solar, wind, bio, hydro, geothermal), including passively through e.g. improved (building) design & landscaping, planning & scheduling, etc.</td></tr>
<tr><td colspan="2">• Deploy nature-inspired designs (biomimicry) & bio-based processes.</td><td rowspan="2">• Switch to using products made of &/or packaged in renewable & compostable materials (e.g. paper/ cardboard bio-plastics &/or other biomaterials).</td><td rowspan="2">• Source segregation of organic materials to improve efficiency & quality in bio-material- &/or bio-energy recovery.</td><td rowspan="2">• Recover, regenerate (or grow) sustainable materials &/or bio-energy from organic waste streams.</td></tr>
<tr><td>• Use organic fertilizers in farming.</td><td>• Eco-design products & packaging with renewable materials &/or for production with renewable auxiliaries (e.g. dyes).</td></tr>
</table>

This innovation space can also be presented as a two-dimensional circular solutions canvas. The columns represent the successive stages in the generalized circular value chain, from resource extraction up to resource recovery, and the rows cover each one of the resource management strategies, respectively: resource circularity; resource efficiency; and resource substitution (to renewables). For each canvas element, example illustrative generic solutions are included in Figure 5, however, these are non-limitative. The application of any of these solutions though will often also impact other stages of the circular value chain and potentially combine several resource management strategies. The canvas applies fundamentally to each resource type, meaning that in principle the canvas could be replicated for material, energy, water, land and other types of resources. However, in many cases specific innovations will address these resource types in an integrated manner, so that the use of this simpler two-dimensional canvas remains most practical.

2.3. Guiding principles for business

> *Circular Economy is increasingly accepted as the global community's best bet to break the vicious cycle of the dependence of the economy on the escalating and unsustainable levels of extraction and use of materials and other natural resources. Put differently, Circular Economy provides the thrust to innovate the economy and society out of the current triple planetary crises. Business, working with knowledge-based institutions and other stakeholders, has the capabilities to innovate and deliver circular products, services and technologies. However, why and how would business step-up to the Circular Economy challenge?*

Beyond the necessity to address the climate, pollution and nature crises of our time, businesses in Southeast Asia continue to be drawn back by questions like[35]: What is the purpose of Circular Economy? What is the scope for business action towards the Circular Economy? What is the rationale for business to get involved in the Circular Economy transition? What are the means available to business for contributing to the Circular Economy? And, beyond environment and climate benefits, how does Circular Economy contribute to the development of society and the economy?

To explore these and associated issues, a series of consensus seeking business engagement workshops were organized in Jakarta, Phnom Phen, Bangkok, Manila, and Kuala Lumpur during October 2023 – April 2024, supported by the EU SWITCH-Asia Policy Support Component[36]. Participants agreed that among many already available definitions[37], a further definition of Circular Economy would not help to get business on board. Rather, participants acknowledged the diversity of Circular Economy concepts and practices, and their different applicability between sectors, business sizes and countries. Thus, recognizing that Circular Economy does not offer a '*one-size-fits-all*' solution, participants felt the need to clearly articulate the overarching ambition of Circular Economy; the meta-idea[38] that Circular Economy solutions are expected to contribute to, or, the proverbial magnetic north for business to navigate its circularity journey.

This led to formulation and endorsement of five guiding principles for business action on Circular Economy, with a particular focus on Southeast Asia[39]. In brief the guiding principles state:

1. **Purpose**: advance net zero for climate, nature and environment;
2. **Scope:** implement resource circularity, resource efficiency, and resource substitution;
3. **Rationale:** assume responsibility for the organization's use of resources and their impacts on environment and society;
4. **Means:** ideate and co-create circular products and services; and
5. **Development Contribution**: create net benefits for society and the economy.

35 Van Berkel, R and T Thomas (2025), Framework for Business Action for the Circular Economy in Southeast Asia, ASEAN Circular Economy Business Alliance, https://www.aceba.co/resource/framework-for-business-action-for-the-circular-economy-in-southeast-asia/

36 See: https://www.switch-asia.eu/our-work/multi-country/asean-circular-economy-pact-acep-mobilizing-business-action-for-circular-economy/

37 See e.g.: Kirchherr, J, N-H N Yang, F Schulze-Spuntrup, M Heerink, and K Hartley (2023) Conceptualizing the Circular Economy (revisited): an analysis of 221 definitions, in Resources, Conservation & Recycling. 1070001. https://doi:10.1016/j.resconrec.2023.107001.

38 Schultz, F, and S Rhein (2024), A colourful bouquet of circular economy research directions: shifting the circular economy debates from scholarly linearity to mutual learning journey for circular applicability., in Resources, Conservation & Recycling, https://doi.org/10.1016/j.resconrec.2023.107346.

39 Van Berkel, R and T Thomas (2025), Framework for Business Action for the Circular Economy in Southeast Asia, ASEAN Circular Economy Business Alliance, https://www.aceba.co/resource/framework-for-business-action-for-the-circular-economy-in-southeast-asia/

A detailed description is provided in Figure 6. By default, guiding principles are neither meant for, nor suited as, operational features or guidelines that organizations could or should adopt. Instead, these serve as a compass to navigate a Circular Economy business transformation. The guiding principles reflect the open-ended innovation space of the Circular Economy (as introduced in section 2.2). They are not a definition, neither individually nor collectively, as they are insufficient to establish whether any specific resource management initiative is circular or not. Instead, the guiding principles do combine good practice intention and elements that can assist business to plan and implement ambitious Circular Economy initiatives.

Figure 6: Guiding principles for business action on Circular Economy[40].

2.4. Measuring circularity

> *The management saying that 'what gets measured, gets managed' has spurred interest to measure, monitor and asses Circular Economy achievements. These have taken different approaches – in itself a reflection of the absence of a commonly-agreed Circular Economy interpretation and ambition - with some focusing on reductions in material flows, and others on cost savings and new revenue generation, and/or impacts on environment and society. Moreover, Circular Economy decisions of one firm or organization are likely to have significant impacts up and down its value chain, far outside of its direct control and influence.*

The Circularity Gap Report series provides an example high level circularity metric by means of an annual estimate of the circularity of the global economy. The 2025 report found that the share of secondary materials in the total materials consumption of the global economy had decreased from 9.1% in 2018 to 6.9% in 2024 – a 25% drop over the course of seven years[41].

40 Van Berkel, R and T Thomas (2025), Framework for Business Action for the Circular Economy in Southeast Asia, ASEAN Circular Economy Business Alliance, https://www.aceba.co/resource/framework-for-business-action-for-the-circular-economy-in-southeast-asia
41 CE (2025), Circularity Gap Report 2025, Circle Economy Foundation, Amsterdam, https://www.circularity-gap.world/2025

Such macro-assessment of circularity status is useful as context, but not actionable for business. Therefore, a number of firm and value chain circularity metrics are being proposed, such as:

- The World Business Council for Sustainable Development (WBCSD) has developed a practical set of circular transition indicators for businesses covering four aspects: close the loop (circularity of input materials, water and energy); optimize the loop (recovery shares and use times); value the loop (business value from circular products); and impact of the loop (greenhouse gas emission, impact on nature)[42]. This framework has been further operationalized for high impact sectors, starting with fashion, chemicals, electronic devices and buildings[43].
- The International Organization for Standardisation (ISO) has published the ISO 59020 Standard for measurement and assessment of circularity[44]. This specifies a three-phased approach, covering: boundary setting; circularity measurement and data acquisition; and circularity assessment and reporting. The measurement covers resource inflows and outflows that are crossing the system in focus, including releases and losses. The assessment can then compute diverse circularity indicators concerning resource inflows (e.g. average reused content of an inflow); resource outflows (e.g., actual recycled material derived from an outflow); water; energy and/or economy (e.g. sales value achieved with circular products and/or services)).
- In 2023, WBCSD embarked jointly with the UN One Planet Network on the development of a Global Circularity Protocol (GCP) for business[45]. This foresees a science-based standardized framework to provide a harmonized methodology for the management, measurement, target setting, and disclosure of circularity performance, aligned with the development of reporting requirements. This GCP initiative has first developed a Circularity Maturity Framework to track the adoption of Circular Economy in business in four maturity levels[46], respectively:
    - Maturity Level 0 (*Not Active*): businesses that are not active in the Circular Economy;
    - Maturity Level 1 (*Measure and Report):* transparent businesses reporting on Circular Economy performance but not (yet) having undertaken any significant changes in products, services, business or value chain;
    - Maturity Level 2 (*Direct Operations*): businesses with improved operations that are reporting on Circular Economy and implementing some circularity solutions and practices in their own business operations (e.g., design, procurement, waste management, etc.); or
    - Maturity Level 3 (*Indirect Operations*): businesses participating in systemic change, combining reporting and implementation in direct operations with implementing and influencing significant changes in their own operations and the wider value chain or sector, requiring the involvement of multiple actors across the value chain or market.

42 WBCSD (2023), Circular Transition Indicators: version 4.0; metrics for business by business, World Business Council for Sustainable Development, Geneva, https://www.wbcsd.org/contentwbc/download/16345/233646/1.

43 WBCSD (2024), Circular Transition Indicators: sector guidance fashion and textiles, World Business Council for Sustainable Development, Geneva, https://www.wbcsd.org/wp-content/uploads/2024/07/CTI_fashion_initiative_sector-guidance_WBCSD.pdf; WBCSD (2024), Circular Transition Indicators: guidance for the chemical industry to accelerate the deployment of circular metrics, World Business Council for Sustainable Development, Geneva https://www.wbcsd.org/wp-content/uploads/2024/03/CTI-Guidance-for-the-chemical-industry-to-accelerate-deployment-of-circular-metrics.pdf; WBCSD (2024), Circular Transition Indicators: sector guidance electronic devices, World Business Council for Sustainable Development, Geneva https://www.wbcsd.org/wp-content/uploads/2024/04/WBCSD_CTI__sector-guidance_electronics-devices.pdf; and WBCSD (2025), Circular Transition Indicators: sector guidance buildings, World Business Council for Sustainable Development, Geneva, https://www.wbcsd.org/wp-content/uploads/2025/05/Circular-Transition-Indicators-CTI-for-Buildings-%E2%80%93-Sector-Guidance.pdf

44 ISO (2024), ISO 59020 Circular Economy: measuring and assessing circularity performance, International Organization for Standardisation, Geneva.

45 WBCSD and OPN (2024), Global Circularity Protocol for business: landscape analysis of circularity-related corporate performance and accountability and policy and regulation, World Business Council for Sustainable Development and One Planet Network, Geneva https://www.wbcsd.org/wp-content/uploads/2024/07/Global-Circularity-Protocol-for-Business-Landscape-Analysis-Full-Deck.pdf

46 WBCSD and OPN (2024), Global Circularity Protocol for business: impact analysis on climate, nature, equity and business performance, World Business Council for Sustainable Development and One Planet Network, Geneva https://www.wbcsd.org/resources/gcp-impact-analysis/

Each of these approaches is ambitious in terms of both their scope - aiming to replicate the established scope 1, 2 and 3 definitions for accounting of Greenhouse Gas (GHG) emissions - and their application - aiming to cater for comparative assertions that compare the circularity performance of different firms for competitive advantage in consumer and financial markets. Undoubtedly these ambitions are praiseworthy, however, their data and transparency requirements may become prohibitive for application, in particular for Small and Medium Enterprises (SMEs) that dominate the Southeast Asian economies and the global supply chains of large corporations.

Hence there is scope for simplified *internal* metrics, that are sufficient to initiate and track company efforts and achievements towards the Circular Economy, are relatively easy to collect, could be self-declared to business partners and other outside parties, yet would not stand scrutiny in a comparative assertion with other or competing products and businesses. Using the underlying concepts and approaches adopted by ISO and WBCSD, Table 5 proposes a simplified set of company internal management indicators which business of all sizes and sectors can consider to track.

Table 5: Suggested Circular Economy metrics for company-internal decision making, target setting, monitoring and self-declaration[47].

Category 1: Enablers (narrative report)		**Category 2: Outcomes** (quantitative report)	
Core	**Supplementary**	**Core**	**Supplementary**
Policy (statement of the organisation's commitment to Circular Economy)	**Resources** (the allocation of human, technological and financial resources by the organisation to its Circular Economy activities)	**Circularity:** • % material circularity • % water circularity	**Business:** • % of revenue from circular products/ services • % of products/ services in portfolio that is circular
Plan (timebound listing of activities to be undertaken by the organisation for its Circular Economy transformation)	**Responsible Business** (the organisation's commitment to responsible business, including its relevant commitments, associations, memberships and reports)	**Efficiency:** • Materials productivity [$/kg] • Energy productivity [$/kWh] • Water productivity [$/$m^3$]	**Impact** • Avoided GHG emission [tCO_2-eq/year] • Amount of waste diverted from disposal/ landfill [ton/year] • Jobs and/or livelihoods created with circular products/services [number of jobs]
Targets (specific targets set for the organisation for achieving its circularity outcomes)	**Innovation** (the organisation's track record and capability to implement improvements and innovations in its products and services and business processes)	**Substitution:** • % renewable energy • % renewable materials	

47 Van Berkel, R and T Thomas (2025), Framework for Business Action for the Circular Economy in Southeast Asia, ASEAN Circular Economy Business Alliance, https://www.aceba.co/resource/framework-for-business-action-for-the-circular-economy-in-southeast-asia

Circular Economy remains an evolving concept, driven by diverse and diverging perspectives.

A common element in the operationalizations of Circular Economy is the need for innovation that leads to circular products and value chains that use materials and natural resources circularly and efficiently, while maximising the use of renewables.

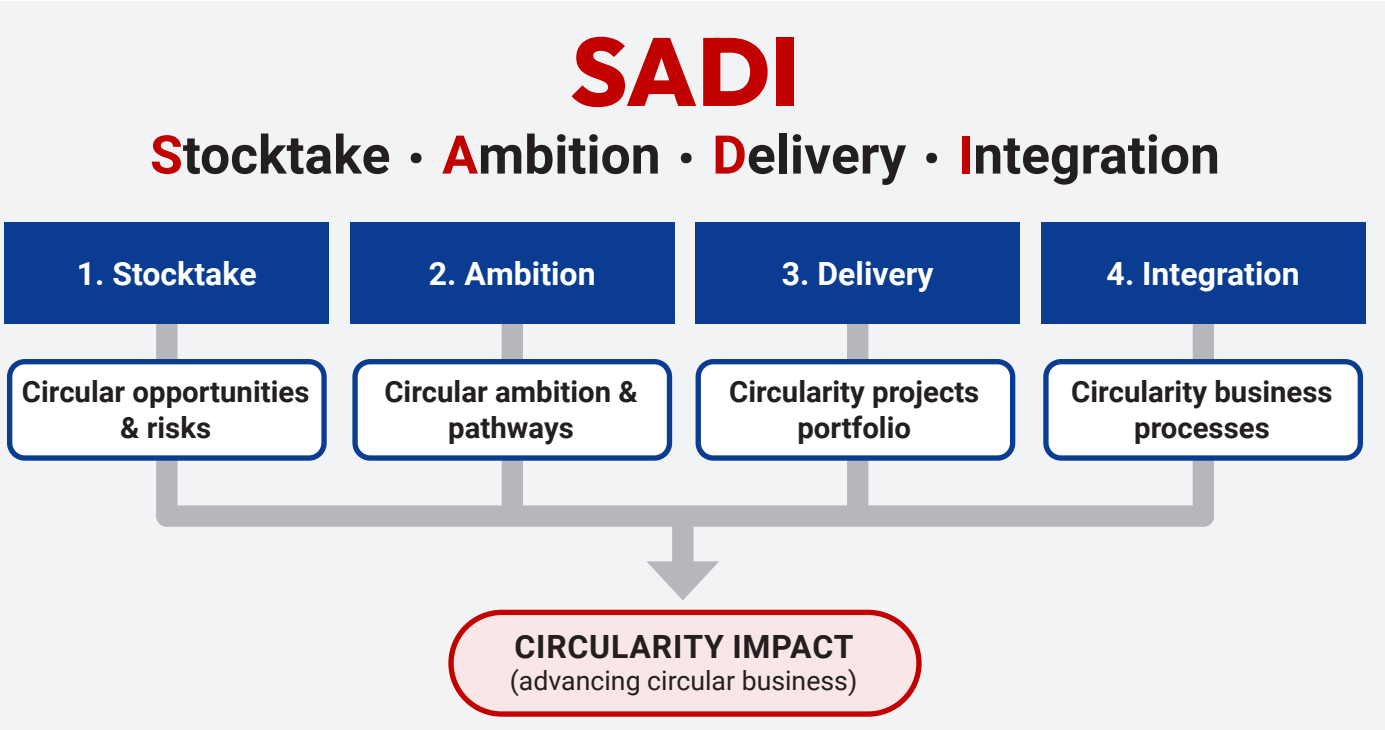
Circular business development stands to benefit from an ambition, articulated as guiding principles, and monitoring to keep track of achievements.

CHAPTER 3: GOING CIRCULAR

The Circular Economy provides a materials' and natural resources' lens to unlock innovation in products, services, operations, value chains and the supporting business models. Such innovations may come from adopting and customizing good practices and best available techniques or arise from experimentation, applying new formal and/or traditional knowledge and learning inside the organization and/or with value chain partners and other stakeholders.

The adoption of Circular Economy will be different for every business and organization, however, there are key activities that any business may consider and undertake in a manner appropriate to its business context and Circular Economy exposure. In this chapter, such key activities are introduced and organized in four practical functional clusters, jointly the SADI approach: Stocktake, Ambition, Delivery and Integration;

These constitute a menu with four activity clusters that contribute to advancing circular business. Each works in isolation, however, its impact increases through synergy between activities. It is not a prescription of a roadmap, despite the in-principle sequential presentation of the activities. Any business can start anywhere, depending on its past experience, level of commitment, market interests, etc. For example, starting with an immediate opportunity, under cluster 3 (delivery) – such as switching from a virgin to a readily-available recycled content input material – may create further confidence on the applicability and relevance of Circular Economy, and could trigger systematic opportunity and risk assessment and ambition setting (as in clusters 1 and 2). Moreover, it is explicitly not aimed to create a stand-alone Circular Economy management and reporting system. Instead, the ambitions, pathways and key actions generated by the Circular Economy activities can feed into existing management systems to sustain momentum and scale circularity and business impact (as elaborated in cluster 4).



An activity menu for advancing circular business

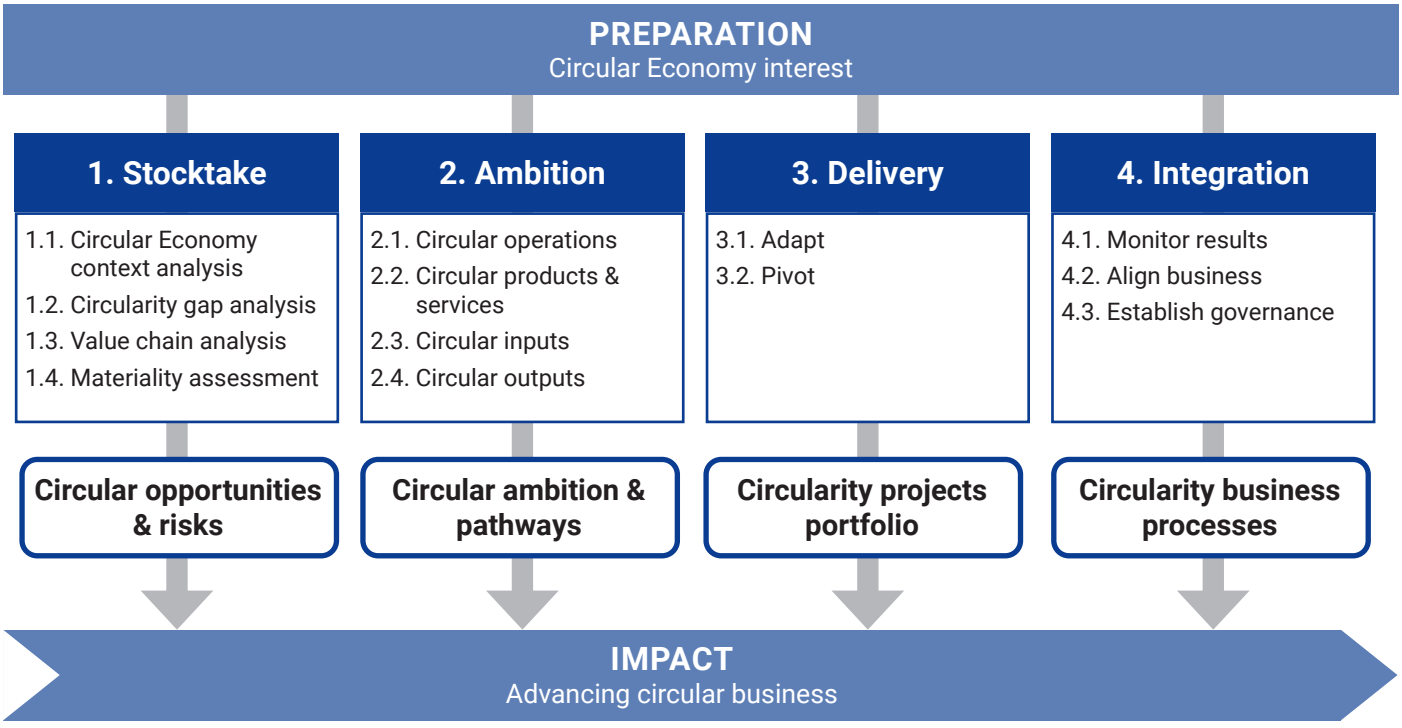
Starting point for engaging with the Circular Economy is at least an initial business interest or commitment to Circular Economy. This is likely to arise from exposure to Circular Economy through interactions with business partners, government and regulatory agencies, and consumers, communities and other stakeholders. This will benefit from an initial generalized understanding of the potential benefits of Circular Economy (*'why'*) and of its operationalization into business actions (*'what'*) as have been elaborated in chapters 1 and 2 of this guidance, illustrated with experiences from Southeast Asian business. Hence the remainder here focuses on activities that advance the circularity of – or circularize - the business, assuming that an initial level of commitment to Circular Economy exists.

Figure 7 summarizes the detailed activities for the four clusters. Each cluster and activity therein are further elaborated in the following sections, addressing three questions:

1. [Description] **What** does this activity entail?
2. [Purpose] **Why** is this activity relevant and necessary?
3. [Procedure] **How** can the objective be achieved?

Being a starter document with intended general applicability across different business sectors, sizes and sustainability and circularity maturity, the procedures are kept succinct and descriptive. Users are encouraged to adapt and further elaborate the methods and procedures that are appropriate and customary to them, however, provided these are then applied with a distinct Circular Economy lens.

Figure 7: Overview of the SADI action clusters for advancing circular business.



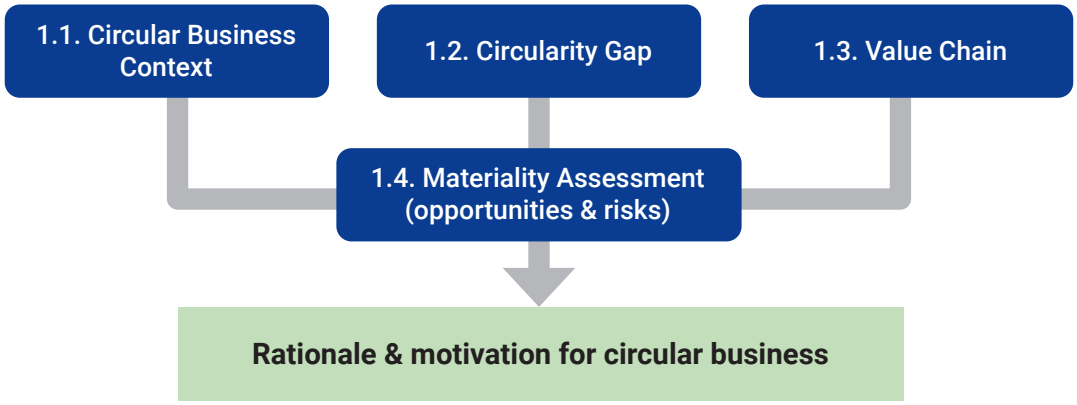
3.1. Stocktake

> *Beyond a general appreciation of the importance of Circular Economy, this stock-taking cluster aims to clarify and underpin a specific justification for Circular Economy for the company. In other words, to consider the opportunities and risks Circular Economy presents to the business and its value chain as justification to guide the Circular Economy adoption and scope where the greatest impact can be made.*

The suggested approach is depicted in Figure 8. Start with making an effort to understand the circularity context, collect some foundational material and resource flow data and map the value chain(s) the business is part of. This information feeds into a materiality assessment of impacts, risks and opportunities, leading to

a comprehensive understanding of the impacts of Circular Economy on the present and future performance of the company.

Figure 8: Cluster 1: Take stock – overview of activities.



1.1. Circular business context

The business context analysis helps to anchor the Circular Economy activities on lessons learned from past and ongoing relevant initiatives and an appreciation of activities of relevant business peers and stakeholders.

1.1. Circular business context	
Purpose	To ground the business' circularity initiatives on the achievements, learnings and understandings that the business has amassed.
Description	A mapping and analysis of all – if any – Circular Economy relevant past and ongoing activities of the company, and the company's current understanding of relevant Circular Economy initiatives of business peers and other stakeholders.
Procedure	1. Set the scope for the context analysis. 2. Gather data. 3. Review and reflect with input from relevant business functions.

The context analysis may follow:

1. *Set the scope*: this means deciding what needs to be analysed and what can be left out. Consider which part of the business activities, products and processes are included, for what time period, and for what material, energy and water flows. Moreover, select a few business peers and stakeholders which are most relevant to the business. And keep a record of what has been included and what excluded.
2. *Gather data*: the key questions are (1) what has the business already done; and (2) what have comparable businesses and/or other stakeholders already done? Relevance to Circular Economy is key, so focus the explorative analysis by Circular Economy strategy, respectively resource efficiency, circularity and substitution. This involves consulting relevant business functions – e.g.: environment, product and market development, operations, procurement, etc. The intent is to map the initiatives, for example in the format suggested in Analysis Sheet 1.
3. *Review and reflect*: capture key outcomes and learnings, which will benefit from inputs of different business functions.

Analysis Sheet 1.1: Circular business context

Circular Economy Strategy	Direct		External	
	Products & Services	**Own Operations**	**Upstream:** Materials extraction and supply chain	**Downstream:** Use and end-of-life management
Part 1: What has the business already done?				
Resource Efficiency: using materials and other resources more efficiently and longer.				
Resource Circularity: recover and reuse materials and other resources.				
Resource Substitution: using renewable energy and materials.				
Part 2: What have comparable businesses and/or other stakeholders already done?				
Resource Efficiency: using materials and other resources more efficiently and longer.				
Resource Circularity: recover and reuse materials and other resources.				
Resource Substitution: using renewable energy and materials.				

1.2. Circularity gap

The circularity gap analysis involves a snap shot analysis of current material, energy and water flows of the company to arrive at proxy indicators that are suitable as an initial baseline for the Circular Economy initiatives.

1.2. Circularity gap	
Purpose	To asses a preliminary - proxy - baseline of the current Circular Economy performance of the company.
Description	The quantification of the principal material, energy and water input flows of the company, taking into consideration their respective recycled and renewables contents.
Procedure	1. Define boundaries. 2. Gather data on material, water and energy inputs. 3. Calculate proxy circularity, efficiency and substitution indicators.

The following procedure can be followed.

1. *Define boundaries*: this involves listing all material, water and energy input flows to the company and determining which of these are to be included in the circularity gap estimate. Ideally, all flows are to be included, however, that is typically not practical, in particular for materials. Consider different cut off rules, for example to ensure that initially at least 80 or 90% of the physical volume of materials, energy and water are covered, or to include in first instance only the product's raw materials and packaging (excluding process auxiliaries, etc.).
2. *Gather data*: collect actual usage data for the last completed accounting year in a common physical unit, e.g. kg or tonne (for materials), kWh or MJ (for energy) and m^3 (for water). For each material and water flow also determine its recycled content (i.e. the physical % share of each flow that originates from some form of reuse, recycling and/or reprocessing), so as to calculate the recycled material and water flows. Likewise for each material and energy flow also determine the share of renewables to calculate renewable material and energy flows. Part 1 of Analysis Sheet 1.1 can be used as further guidance.
3. *Calculate proxy indicators*: it is suggested to use indicators for circularity (recycled material and water shares), for efficiency (material, water and energy productivity) and substitution (renewable materials and energy shares). Part 2 of Analysis Sheet 1.2 shows the calculations.

Analysis Sheet 1.2: Circularity gap

Annual Turn Over ($)	Part 1: Resource flows				
	Source?		Annual Flows		
[TO]	Recycled contents (%) [A]	Renewable contents (%) [B]	Annual flow (total) [C]	Annual recycled flow [D] = [A]*[C]	Annual renewable flow [E] = [B]*[C]
Materials (kg, tonne): 1.... 2....					
Total Materials Flows			Σ [M1]	Σ [M2]	Σ [M3]
Energy (MJ, kWh): 1..... 2.....	Not applicable			Not applicable	
Total Energy Flows			Σ [E1]	Not applicable	Σ [E2]
Water (m^3): 1..... 2.....		Not appliable			Not applicable
Total Water Flows			Σ [W1]	Σ [W2]	

Part 2: Proxy circularity indicators					
Resource Circularity (%)		Resource Efficiency		Resource Substitution (%)	
Recycled materials	= M2/M1	Materials productivity	= TO/M1	Renewable materials	= M3/M1
Recycled water	= W2/W1	Energy productivity	=TO/E1	Renewable energy	= E2/E1
		Water productivity	= TO/W1		

1.3. Value chain

The value chain analysis considers the material, energy, water and related impacts of the products or services starting from raw materials extraction, up to recovery or disposal at their end-of-life. It sheds light on potential vulnerabilities and circularity opportunities, as well as business partners and stakeholders involved.

1.3. Value chain	
Purpose	To understand how the company's performance is dependent on the use and discharge of materials and other resources in its upstream and downstream value chain.
Description	Mapping of material- and resource-related impacts, vulnerabilities and opportunities along the value chain(s) the company is part of.
Procedure	1. Clarify the value chain(s). 2. Analyse materials' and resources' issues. 3. Map key stakeholders.

The following procedure can be followed.

1. *Clarify the value chains:* as a starting point, consider at least the following five stages: raw materials extraction; suppliers (of materials, parts, subassemblies, packaging, etc.); own operations; product use; and end-of-life (potentially inclusive of recovery as start of a new cycle). List what are the key activities taking place in each of these five stages.
2. *Analyse materials' and resources' issues:* this is meant as an inventory of – known – concerns in regard to the use and discharge of materials, energy, water and other natural resources in the different stages of the value chain. This information is not routinely collected by individual businesses and relies significantly on expert judgement. However, information on value chains and their environmental and social impacts is increasingly available in the public domain, at least in qualitative or semi-quantitative manner. This may be sufficient, and it is also be fine to record information gaps that cannot be immediately resolved. Keep a focus on key issues in terms of the quantity used, its scarcity, hazard or otherwise. Analysis Sheet 1.3 suggests a way to record the findings.
3. *Map key stakeholders:* in parallel, document who are the key stakeholders in each stage of the value chain, such as raw material companies, suppliers, customers, waste management companies, regulators and technical institutions.

Analysis Sheet 1.3: Value chain

		Issues – What materials and other natural resources are critical?	**Stakeholders -** Who is involved?
Upstream	Materials extraction		
	Suppliers (materials, parts, components, etc)		
Direct	Own operations		
Downstream	Product Usage		
	End of Life/Start of new cycle		

1.4. Materiality assessment

The success of any company is dependent on many factors, each of which can either have positive impacts, thus opportunities, or negative impacts, thus risks. The previous activities (1.1-1.3) explored dependencies caused or influenced by the use and discharge of materials and other natural resources by the company and up- and downstream in its value chains. The materiality assessment prioritizes these impacts based on their likelihood and the scale of positive or negative impact on the business.

1.4. Materiality assessment	
Purpose	To select the most significant impacts of Circular Economy on the current and future financial and other performances of the company.
Description	Systematic assessment of the likelihood and scale of opportunities and risks the Circular Economy transition is presenting to the performance of the company, now and/or or into the foreseeable future.
Procedure	1. Identify the risks and opportunities. 2. Analyse and select priority impacts.

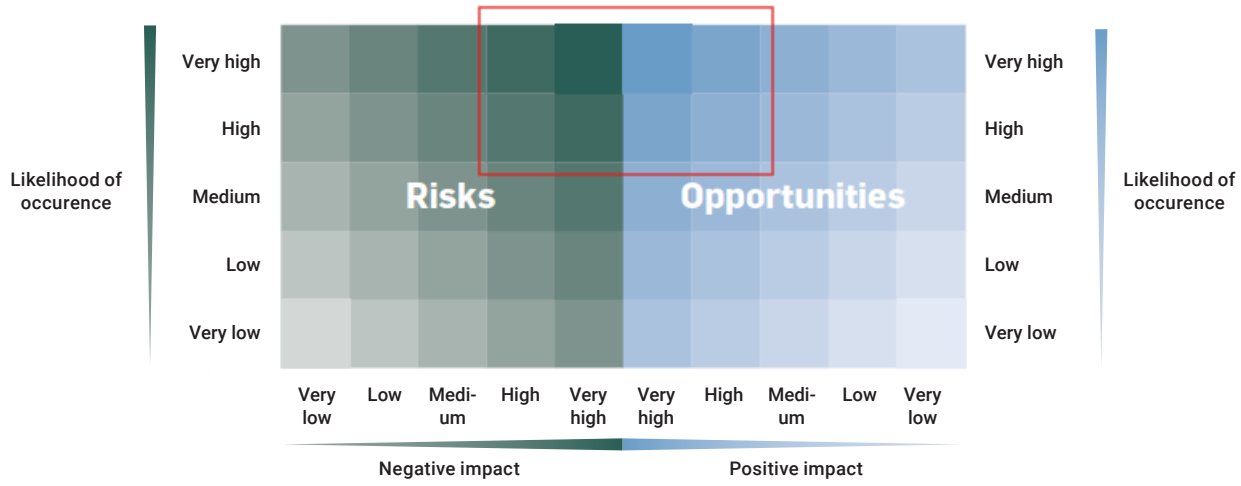
The following procedure is suggested.

1. *Identify the risks and opportunities:* reflecting upon the findings from the analysis of the circular business context, the present circularity gap and the value chain (activities 1.1, 1.2 and 1.3) list the risks and opportunities to the financial and overall performance of the company from the perspective of the Circular Economy.
2. *Analyse and select priority areas:* assign a rating for the likelihood of occurrence and the scale of impact to each risk and opportunity identified. This may use a five-point indicative scale, taking into consideration the expertise and viewpoints of relevant business functions, as in Analysis Sheet 1.4. Once all are analysed, the risks and opportunities having the highest likelihood and highest positive and negative impact provide the company's specific rationale and scope for Circular Economy.

Analysis Sheet 1.4: Materiality assessment[48]

Part 1: Identify Risks and Opportunities					
What risks does the company face?			**What opportunities arise for the company?**		
Risk	**What is the likelihood?***	**What would be the negative impact?****	**Opportunity**	**What is the likelihood?***	**What would be the positive impact?****
1…….			1…….		
2…….			2…….		
3……			3……		
……			……		

Part 2: Select priority Circular Economy impacts for the company



Priority impacts
1…….
2…….
……

(*) Consider using a five-point likelihood scale, respectively: very low; low; medium; high: and very high.
(**) Consider using a five-point impact scale, respectively: very low; low; medium; high; and very high.

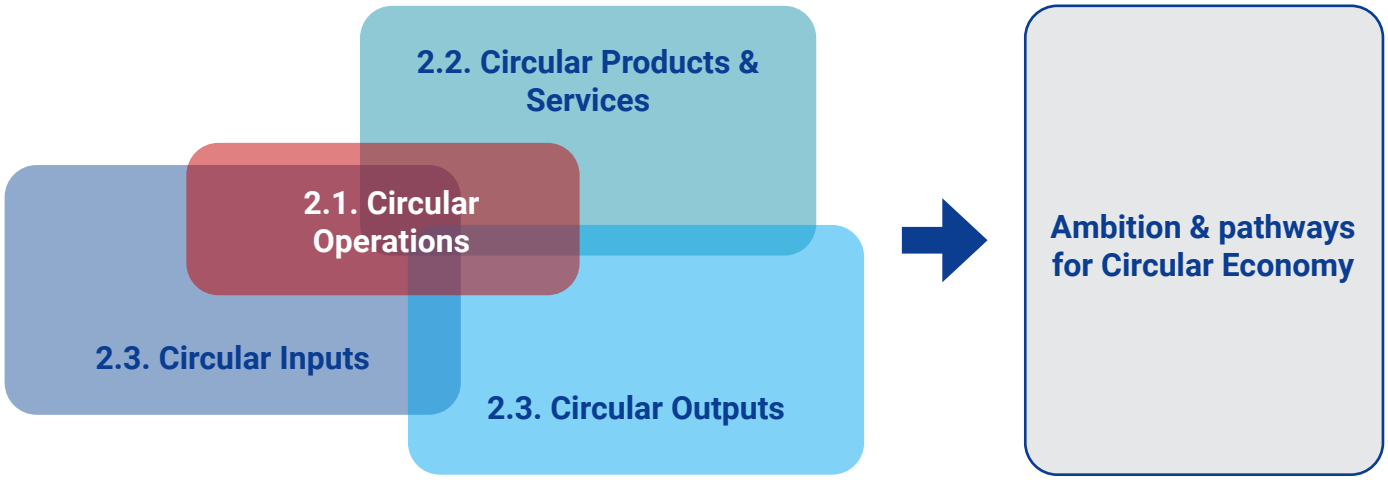
48 Based on: Ernesto, M; Mazure, D; Patzelt, D; Schimmelpfeng, L and Tauer, R (2025), Strategy Guide: Circular Economy; a step-by-step guide to becoming an impact-oriented company in a circular economy, Global Compact Network Germany, https://www.globalcompact.de/mediathek/publikationen/publikation/strategy-guide-circular-economy.

3.2. Ambition

The following forward-looking activities are concerned with developing an appropriate Circular Economy ambition for the business and identifying impact-full delivery pathways[49]. In other words, taking a Circular Economy perspective, how can the company make a transformative impact towards the Circular Economy on the medium term, say within a 5 to 10-year horizon? Having a medium-term ambition, serves as the compass or 'magnetic north' to zoom in on specific delivery pathways for implementation (which may also be interpreted as systemic opportunities for advancing circular business).

The activity involves considering the business from four perspectives: products and services; operations; inputs; and outputs (as in Figure 9). These are inter-related and partially overlapping, however, each offers a distinctive perspective for the Circular Economy ambition and consideration of appropriate delivery pathways for the company. These perspectives can be applied successively, in any order, or in an integrated manner moving to successive business areas, product portfolios and/or markets.

Figure 9: Cluster 2: Ambition – overview of activities.



2.1. Circular operations

Circular operations concern circularity solutions directly implemented in the company's own operations, which may include production, utilities, warehousing, logistics, services, buildings management, support operations, etc. Transitioning to circular operations starts with setting an ambition that is specific to the company, based on interpretation and application of an ambition benchmark for operations and its subgoals. Next, possible delivery pathways are explored, in particular it is suggested to cover: resource efficient and cleaner production; closed loop systems; and nature regeneration.

49 The ambition benchmark methodology proposed for the forward looking activities is inspired by the SDG Ambition Benchmarks methodology, which has been developed and promoted by the United Nations Global Compact, see: UNGC (2022), SDG Ambition Benchmark Reference Sheets, United Nations Global Compact, https://unglobalcompact.org/library/5790.

2.1. Circular operations	
Purpose	To determine the ambition and its delivery pathway(s) for adopting Circular Economy in the company's own operations.
Description	Translation of ambition benchmark and its subgoals for circular operations into specific ambition(s) for the company's own operations and consideration of appropriate delivery pathways.
Procedure	1. Determine company ambition for circular operations. 2. Analyse delivery pathways for circular operations.

The activity can be undertaken as shown in Analysis Sheet 2.1.

1. *Determine company ambition*: start from the ambition benchmark which states that all operations have Circular Economy practices incorporated. This applies to materials and waste, energy, water and effluents, and use of nature. This ambition benchmark implies at least the following four generic subgoals:
    1. All input materials are incorporated into valuable products – this implies zero waste of the materials that are acquired to be incorporated in the products and/or their packaging.
    2. Energy use and GHG emissions from operations are reduced in line with the carbon neutrality goal – this carbon neutrality implies that the GHG emissions approach zero and that any remaining emissions are compensated by the capture and sequestration of carbon emissions elsewhere[50].
    3. Water use of operations is reduced towards water neutrality – the water neutrality concept is both quantitative (water extractions from nature are equal to or smaller than water discharges from the company back into nature) and qualitative (discharged water has similar – or possibly even better - physical, chemical and other properties as the extracted water). The qualitative dimension implies net zero discharge of pollutants to ambient water bodies.
    4. Land and nature use are improved and support regeneration to achieve at least nature neutrality – the nature neutrality concept implies that any loss of nature or of land/soil quality is compensated or off-set by at least an equal amount of rehabilitation of degraded nature and/or land elsewhere.

    The company ambition is determined by asking to what extent the company will approach these (and/or possibly other related) subgoals, as in Part 1 of Analysis Sheet 2.1.

2. *Analyse delivery pathways*: next, consider delivery pathways as subsets or categories of (proven) Circular Economy solutions that are critical for delivering the stated ambition for circular operations. Consider at least the following:
    a. *Resource Efficient and Cleaner Production*: this itself is an umbrella term that brings together (industrial) productivity methods (e.g. Kaizen, total productivity management, etc.) and preventive environmental strategies (e.g. pollution prevention, waste minimization, green chemistry, etc.). It aims for continuous improvement of the efficiency of the use of materials, energy and water, and the continuous minimization of waste, waste water and climate and other emissions, through e.g. better planning, monitoring and management of operations, improved equipment and/or alternative process technologies, optimization of inputs and of utility operations, etc.;
    b. *Closed Loop Systems*: applied to operations this means keeping process auxiliaries in continuous recovery and reuse loops. It is applicable to auxiliary materials (e.g. solvents, lubricants, catalysts, etc.), water (process and cooling water) and thermal energy. New separation and recovery techniques and availability of lower cost and accurate sensors and computing power, provide new impetus for achieving closed loop systems; and

50 The climate neutrality concept is further operationalized for businesses and other organizations by the Science Based Targets initiative (SBTi), see: https://sciencebasedtargets.org/

c. *Nature Regeneration:* this aims for regenerating or restoring nature, land and waterways to '*as natural*' or '*undisturbed*' conditions and applies to operations which have a direct impact on land and nature, including: farming, forestry, fishing, mining, quarrying, etc. It generally involves restoring and balancing natural flows of biomass (carbon) and nutrients, reducing inflows of (agro-)chemicals, and improving resilience to droughts, floods and other extreme conditions – each of these in turn is supportive of healthy, resilient and bio-diverse ecosystems and thereby facilitates the regeneration of nature.

Analyse both the applicability and the priority of these delivery pathways in the specific company context, as indicated in Part 2 of Analysis Sheet 2.1.

Analysis Sheet 2.1: Circular operations (ambition and delivery pathways)

Part 1: Company ambition	
Benchmark	**100% of operations have Circular Economy practices incorporated**
Scope	Materials & Waste Energy Water & Effluents Land & Nature
Subgoals (generic)	1. All input materials are incorporated in valuable products. 2. Energy use and GHG emissions from operations are reduced in line with the carbon neutrality goal. 3. Water use of operations is reduced towards water neutrality. 4. Land and nature use are improved and support regeneration to achieve at least nature neutrality.
Ambition (company specific)	To what extent will the company approach the relevant subgoals? 1. …… 2. …… 3. ……

Part 2: Delivery pathways		
Pathways	**Priority (High, Medium, Low)**	**Specific applicability for the company**
1. Resource Efficient and Cleaner Production		
2. Closed Loop Systems		
3. Nature Regeneration		
4. ……		

2.2. Circular products and services

Circular products and services concern circularity-driven changes in the company's products (including packaging) and services. These are the result of eco-(re)-design; i.e. the application of design thinking[51] with consideration of the environmental aspects at all stages of the product or service development process, thus striving for products and services which make the lowest possible environmental impact throughout their life cycle (from materials extraction up to final disposal of end-of-life products). The development and implementation of circular products and services starts with setting an ambition that is specific to the company, based on interpretation and application of the ambition benchmark for circular products and services and its subgoals. Next, possible delivery pathways are explored, in particular: products that last; products that flow; circular services; and circular packaging.

2.2. Circular products and services	
Purpose	To determine the company's ambition and delivery pathways for designing Circular Economy into the company's products and services.
Description	Translation of ambition benchmark and its subgoals for circular products and services into specific ambition(s) for the company's own products and services and consideration of appropriate delivery pathways for achieving this ambition.
Procedure	1. Determine company ambition for circular products and services. 2. Analyse delivery pathways for circular products and services.

The activity can be undertaken as shown in Analysis Sheet 2.2.

1. *Determine company ambition*: start from the ambition benchmark which states that all products and services have Circular Economy designed in. This applies equally to durable goods (such as furniture, white goods, bicycles, etc.), fast moving consumer goods (e.g. (processed) food and beverages, single use products/disposables, fast fashion, etc.), services (e.g. hospitality, entertainment, professional, etc.) and packaging (including customer, distribution and supply chain packaging). This ambition benchmark involves at least the following three generic subgoals:
    1. Products and services that last for an extended duration: eco-design that leads to significantly longer and/or more intensive use of the product or service, by the same or multiple users through improved durability, timelessness, adaptability, etc.
    2. Products and services that improve lifecycle resource efficiency: eco-design that reduces the use of materials, energy, water and other auxiliaries throughout the product and service lifecycles. This involves energy and water efficiency in materials production, component and product manufacturing and use and for logistics. It also involves dematerialization by designing products and packaging with minimal weight and volume.
    3. Products that are fully adapted for comprehensive end-of-life recovery: eco-design that facilitates and achieves full recovery of components and materials at their highest possible quality, through e.g. improved disassembly, reduced material diversity and complexity, etc.

    The company ambition is determined by asking to what extent the company will approach these (and/or possibly other related) subgoals, as in Part 1 of Analysis Sheet 2.2.

51 Design thinking is a practical approach for problem solving, that typically includes five steps: empathize (to understand end-user needs); define (product or service requirements); ideate (brainstorm and create possible solutions); prototype (build representations of one or more ideas); and test (validate and improve prototype with end-users' feed-back).

2. *Analyse delivery pathways*: next, consider delivery pathways as subsets or categories of (proven) Circular Economy solutions that are critical for delivering the stated ambition for circular products and services. Consider at least the following:

   a. *Products that Last:* eco-design for durable (consumer) goods with primary focus on extension of the duration and/or the intensity of use, whilst improving resource efficiency in the use stage and over the lifecycle. This may focus on improving attachment and trust, durability, standardization, compatibility, adaptability and upgradability, efficiency in use, and ease of maintenance, repair, disassembly and reassembly;

   b. *Products that Flow*: eco-design for fast moving consumer goods and packaging aimed at achieving closed loop flows of materials by slowing down the flow of products (through solutions like reuse, refill, or product-as-a-service), narrowing down the flow of products (lightweight and appropriately sized) and closing the return flow of the materials contained in the product (organizing neat collection and efficient sorting and recycling);

   c. *Circular Services:* eco-design of services to optimize the duration or lifetime of the service; deliver the services in more resource-efficient manner (i.e. circular operations for service providers) and use circularity-supporting products (i.e. circular inputs for service providers); and

   d. *Circular Packaging:* eco-design that creates closed loop flows of all packaging materials and efficient forward and reverse logistics and warehousing at all life-cycle stages, whilst minimizing loss of product value or product wastage.

   Analyse both the applicability and the priority of these delivery pathways in the specific company context, as indicated in Part 2 of Analysis Sheet 2.2.

Analysis Sheet 2.2: Circular products and services (ambition and delivery pathways)

Part 1: Company ambition	
Benchmark	**100% of products and services have Circular Economy designed in**
Scope	Durable Goods Fast Moving Consumer Goods Services Packaging
Subgoals (generic)	1. Products and services that last for an extended duration. 2. Products and services that improve lifecycle resource efficiency. 3. Products that are fully adapted for comprehensive end-of-life recovery.
Ambition (company specific)	To what extent will the company approach the relevant subgoals? 1. …… 2. …… 3. ……

Part 2: Delivery pathways		
Pathways	**Priority (High, Medium, Low)**	**Specific applicability for the company**
1. Products that Last		
2. Products that Flow		
3. Circular Packaging		
4. Circular Services		
5. ……		

2.3. Circular inputs

The shift to circular inputs involves integration of Circular Economy criteria into the sourcing of company inputs, including materials, energy and water, and the resource-efficiency of the respective supply chains. Operationalization of circular inputs begins with determining an ambition that is specific to the company, based on interpretation and application of the ambition benchmark for circular inputs and its affiliated subgoals. Next, explore possible delivery pathways, at least: circular materials; circular energy; and circular water.

2.3. Circular inputs	
Purpose	To determine the ambition and delivery pathways for adopting Circular Economy in the sourcing of inputs for the company.
Description	Translation of ambition benchmark and its subgoals for circular inputs into specific ambition(s) for the company's sourcing of materials, water and energy and consideration of appropriate delivery pathways for achieving this ambition.
Procedure	1. Determine company ambition for circular inputs. 2. Analyse delivery pathways for circular inputs.

The activity can be undertaken as shown in Analysis Sheet 2.3.

1. *Determine company ambition*: start from the ambition benchmark which states that all resource inputs, including materials (for products and packaging and as process or operational auxiliaries), energy and water, are circular, both by source (switching to recycled and renewable inputs) and by product destination (ensuring full reusability, recyclability and/or compostability). This ambition benchmark expands into four subgoals for circular supplies:

    1. All materials are recyclable and/or reusable: this is a foundational requirement ensuring that materials can be recovered and returned to another useful application at the end-of-life of the service or the product and its packaging.
    2. Zero out the use of substances of concern: this refers to substances present in the product's materials (either the main material and/or as an additive (e.g. plasticizer, dye or paint)) that interfere with efficient recovery of high-quality secondary materials. This interference can be technical (incompatible material specifications, unable to separate, etc.) or the creation of a risk or hazard to human health and/or the environment during recycling and/or carried forward with the recycled materials or recycled water.
    3. Maximize the use of recycled materials and water: this entails using available secondary material and water sources recovered from previously discarded wastes or discharges to meet the company's requirements.
    4. Maximize the use of renewable materials and energy: reducing climate and possibly other environmental impacts by switching to renewable or bio-materials and all available forms of renewable energy, including solar, wind, bio, hydro, geothermal and possibly others. The extraction though is to be kept at a rate below the regeneration by nature, or, in short, renewable materials and energy are to be sustainably-sourced.

    Set the company ambition by asking to what extent the company will approach these (and/or possibly other related) subgoals, as in Part 1 of Analysis Sheet 2.3.

2. *Analyse delivery pathways*: next, consider delivery pathways as subsets or categories of (proven) solutions for circular selection and sourcing of company inputs that are critical for delivering the stated circular input ambition. Consider at least the following:

   a. *Circular Materials*: apply circularity principles to materials selection and procurement, including: reusability, recoverablity and recyclability; recycled and/or renewable contents, and absence of substances of concern;

   b. *Circular Water*: involves the integration of circularity principles in water sourcing, particularly to maximize the use of secondary or recycled water and to ensure that the sourced water is fit-for-purpose (avoiding wastage of high-quality water in applications that do not require high purity); and

   c. *Circular Energy*: application of circularity principes in the sourcing of energy. Principally to transition fully to renewable energy in all its forms for all company applications. Moreover, it involves using recovered or secondary thermal energy for heating or cooling applications, e.g. energy recovered from cooling water, condensate, hot or cold product streams and equipment or otherwise.

   Analyse both the applicability and the priority of these delivery pathways in the specific company context, as indicated in Part 2 of Analysis Sheet 2.3.

Analysis Sheet 2.3: Circular inputs (ambition and delivery pathways)

Part 1: Company ambition	
Benchmark	**100% circular resource inputs**
Scope	Materials Energy Water
Subgoals (generic)	1. All materials are recyclable and/or reusable. 2. Zero out the use of substances of concern. 3. Maximize the use of recycled materials and water. 4. Maximize the use of sustainably-sourced renewable materials and energy.
Ambition (company specific)	To what extent will the company approach the relevant subgoals? 1. …… 2. …… 3. ……

Part 2: Delivery pathways		
Pathways	**Priority (High, Medium, Low)**	**Specific applicability for the company**
1. Circular Materials		
2. Circular Water		
3. Circular Energy		
4. ……		

2.4. Circular outputs

The shift to circular outputs covers the application of Circular Economy practices for the company's end-of-life products, or post-consumer waste, and the non-product outputs of its operations and supply chain, or the pre-consumer wastes and pollutants. Planning and operationalization of circular outputs begins with determining an ambition that is specific to the company, based on interpretation and application of the ambition benchmark for circular outputs and its affiliated subgoals. Next, possible delivery pathways are explored, at least: resource recovery; zero waste (specifically to landfill and incineration); and zero discharge (of – hazardous - pollution to water, soil and/or air).

2.4. Circular outputs	
Purpose	To determine the ambition and delivery pathways for Circular Economy in the management and recovery of end-of-life products and non-product outputs.
Description	Translation of ambition benchmark and its subgoals for circular outputs into specific ambition(s) for the company concerning its end-of-life products and non-product, pre-consumer wastes and pollution, and consideration of delivery pathways for achieving this ambition.
Procedure	1. Determine company ambition for circular outputs. 2. Analyse delivery pathways for circular outputs.

The activity can be undertaken as elaborated in Analysis Sheet 2.4.

1. *Determine company ambition*: start from the ambition benchmark which states that all – non-value-adding - resource outputs, particularly end-of-life products and non-product outputs (specifically waste and pollutants), are managed and appropriately recovered for a further use cycle. This ambition benchmark expands into three complementary subgoals for circular outputs:

    1. 100% resource recovery: all products, components and materials are recovered from end-of-life products for a further useful application (e.g. refurbish, remanufacture, reuse and/or recycling).
    2. Zero out the disposal of waste to landfill and for incineration: minimize the generation of pre-consumer waste (non-product outputs from own operations and in the value chain) and divert the remainder away from landfill or incineration through such activities as third-party direct reuse, repurposing and/or recycling.
    3. Zero out the release of pollutants to water, soil and/or air: zero out the release of - hazardous - pollutants and harmful chemicals into the environment through the reduction of both the use and the formation (as undesired by-products or otherwise) and the recovery of non-avoidable pollutants and chemicals for environmentally sound recycling or destruction.

    Set the company ambition by asking to what extent the company will approach these (and/or possibly other related) subgoals, as in Part 1 of Analysis Sheet 2.4.

2. *Analyse delivery pathways*: next, consider delivery pathways as subsets or categories of (proven) solutions for circular management and recovery of non-valuable product and process outputs that are critical for delivering the stated circular output ambition. Consider at least the following:

    a. *Resource Recovery*: this involves the recovery of products, components, parts and materials from end-of-life products (including packaging and use-phase auxiliaries) and their useful application for a further use cycle, through e.g., reuse, repair, refurbishment, remanufacturing and/or recycling;

    b. *Zero Waste*: the diversion of pre-consumer waste and byproducts (from production, supply chain, logistics, distribution and marketing) from landfill and incineration. This involves waste minimization to design out and reduce pre-consumer wastes, largely through the circular operations and circular inputs strategies. It also involves revalorization of the remaining waste, through e.g. trading of deadstock inventory and cut-offs for repurposing into other products, symbiotic reuse of the company's waste as substitute material or energy input for another co-located company, and/or materials separation and recycling; and

c. *Zero Discharge:* diversion of pollutants and chemicals from release into the environment (water ways, soil and/or atmosphere). The reduction of pollutants is the first priority, through switching to less harmful chemicals as inputs or switching to cleaner processes that avoid the generation of harmful pollutants. Furthermore, capture and contain the remaining pollutants, avoiding their potential release into the environment, for environmentally sound recovery, recycling or – as a last resort – destruction with energy recovery.

Analyse both the applicability and the priority of these delivery pathways in the specific company context, as indicated in Part 2 of Analysis Sheet 2.4.

Analysis Sheet 2.4: Circular outputs (ambition and delivery pathways)

Part 1: Company ambition	
Benchmark	**100% circular resource outputs**
Scope	End-of-Life Product (Pre-consumer) Waste Pollutants
Subgoals (generic)	1. 100% resource recovery. 2. Zero out the disposal of waste to landfill and for incineration. 3. Zero out the release of pollutants to water, soil and/or atmosphere.
Ambition (company specific)	To what extent will the company approach the relevant subgoals? 1. …… 2. …… 3. ……

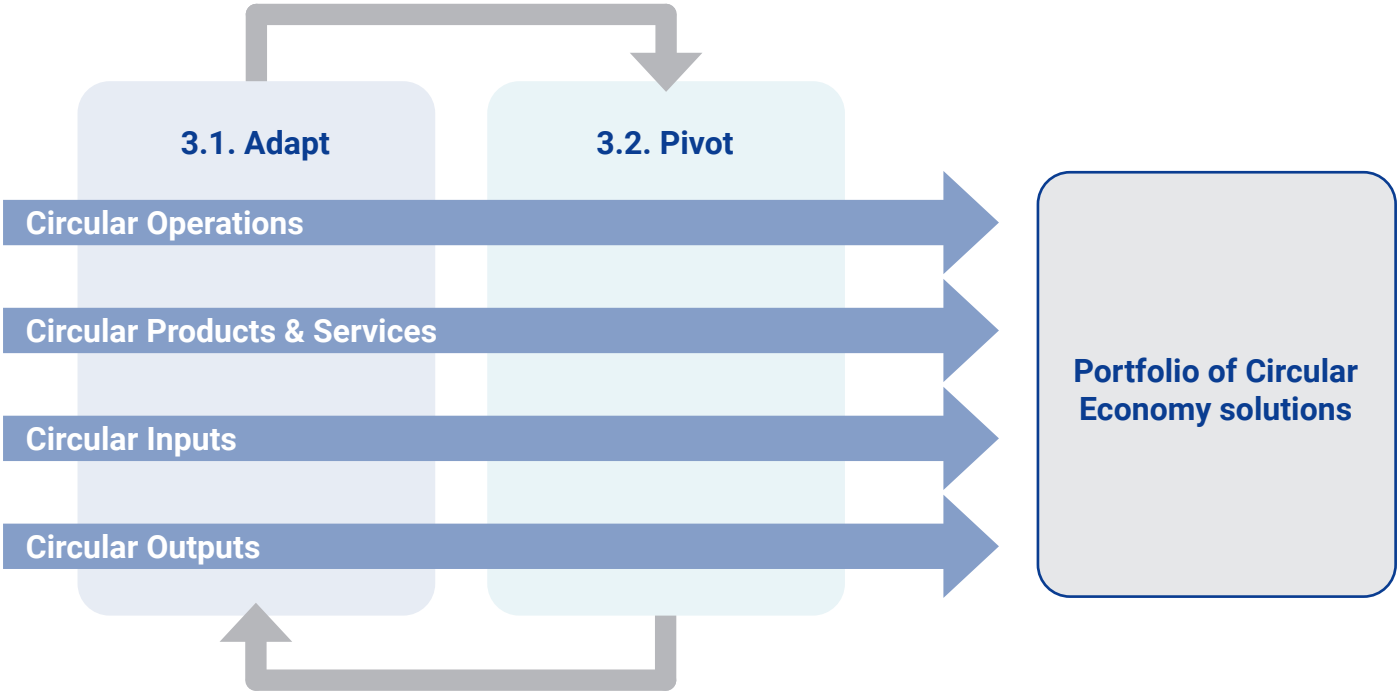
Part 2: Delivery pathways		
Pathways	**Priority (High, Medium, Low)**	**Specific applicability for the company**
1. Resource Recovery		
2. Zero Waste		
3. Zero Discharge		
4. ……		

3.3. Delivery

> *This Delivery activity cluster is concerned with starting the practical execution of circular business initiatives or projects in the company. In other words, making technical and/or operational changes in products, operations, inputs and/or outputs that improve the circularity, efficiency and/or longevity of the use of materials, energy and/or water, whilst also increasing the utilization of sustainably-sourced renewable materials and energy.*

The Delivery-cluster operationalizes and executes the pathways towards the company's ambitions (which can be formally set with activities in the Ambition cluster (see section 3.2)). Delivery can be in the form of adaptation of good practices to the company's specific opportunities and requirements: this means building upon already available circularity solutions from elsewhere. It can also be through pivoting transformative solutions for greater circularity and business impact, i.e. circularity solutions that are designed and developed specifically for the company and could differentiate the company from competitors and value chain partners. A beneficial synergy is foreseen between adaptation and pivoting, as shown in Figure 10. This initiates progression towards the Circular Economy, with the aim of continuous improvement, or a circularization of the business, rather than a wholesale, once-off circular business conversion.

Figure 10: Cluster 3: Delivery – overview of activities.



3.1. Adapt

As introduced in section 2.1, Circular Economy evolved as an umbrella term that brings together and synergises established sustainability practices, such as cleaner production, eco-efficiency, eco-design, industrial symbiosis, waste minimization, etc. This implies that any company can start its circularity transition with the consideration of known, and often at least partially-generalizable, solutions that originated from these contributing sustainability practices. Adapt, as an activity, aims to generate and implement Circular Economy solutions for the company through inspiration and adaptation of such known solutions. This offers potential for "*quick wins*" that deliver business results and circularity impact using techniques and practices that are already available, such as using recycled contents materials, integrating renewable energy or deploying more energy and/or water efficient equipment and buildings.

3.1. Adapt	
Purpose	To improve the circularity of operations, products, inputs and/or outputs through adaptation and implementation of known Circular Economy-relevant solutions.
Description	Consideration of known, elsewhere-documented, Circular Economy-relevant solutions to adapt these to company opportunities and needs, followed by their assessment and the subsequent implementation of those found having the greatest potential impact on the business and for the Circular Economy.
Procedure	1. Determine improvement areas. 2. Identify and evaluate improvement opportunities. 3. Implement prioritised solutions.

This generic approach is further outlined below, however, requires to be customized to the specific improvement areas and solutions being considered, building upon the company's own practices and experiences in implementing operational and technical improvement projects. It is also expected to be repeated periodically to maintain an evolving active portfolio of Circular Economy solutions for the company to proceed over time.

1. *Determine improvement areas:* building upon the set ambition and delivery pathways, consider and determine specific improvement areas for the company, covering operations, products & services, inputs and/or outputs. If, for example, circular products feature high as ambition, then consider and select one – or a collection or set – of product(s) that are to be targeted first for adaptation. Consider different criteria, e.g. scale of the circularity impact, risk or opportunity for the company, alignment with the company's investment and product or other development strategies, etc. The results can be documented in Part 1 of Analysis Sheet 3.1.
2. *Identify and evaluate improvement opportunities*: consider common starting points (as included in Table 6) for each delivery pathway that is applicable to each improvement area. How could each starting point be operationalized to the specific operation, product, input or output and further adapted to the company's specific markets, needs and competencies? This explorative and creative search for potential improvements, will benefit from established innovation and project management practices and involvement of cross-disciplinary teams, covering operations, technical, marketing, procurement, environment, etc., as appropriate. Once a long list of improvement opportunities is compiled, assess the potential impacts of each one on the business as well as towards the Circular Economy. This assessment may use protocols and criteria commonly used by the company, and customized to the complexity and scale of each opportunity and its costs. Part 2 of Analysis Sheet 3.1 can be used to document the result of this assessment.
3. *Implement prioritized solutions:* select those opportunities that have the best prospects for business and/or circularity impact and plan and execute their implementation, as can be documented in Part 3 of Analysis Sheet 3.1. Depending on the specific solution, this may involve further project planning, engineering and procurement, and monitoring, commensurate to the specifics of the prioritised solutions, adopting established business procedures of the company.

Analysis Sheet 3.1: Adapt

Part 1: Improvement areas			
Circular Economy approach	**What specific product(s), service(s), operation(s), input(s) and/or output(s) are targeted for improvement?**		
1. Circular Operations			
2. Circular Products & Services			
3. Circular Inputs			
4. Circular Outputs			
Part 2: Improvement opportunities			
Delivery strategy	**Specific operationalizations for the company's improvement areas (use the suggestions in Table 6 as a starting point)**	**Potential for business benefit (e.g. +, - or ?)**	**Potential for circularity impact (e.g. +, - or ?)**
<u>Circular Operations</u> • Resource Efficient and Cleaner Production • Closed Loop Systems • Regenerative Nature Solutions			
<u>Circular Products & Services</u> • Products that Last • Products that Flow • Circular Services • Circular Packaging			
<u>Circular Inputs</u> • Circular Materials • Circular Water • Circular Energy			
<u>Circular Outputs</u> • Resource Recovery • Zero Waste • Zero Discharge			
Part 3: Circular solutions			
What solutions are prioritized and agreed for implementation?			
1…… 2…… 3…… 4…… 5……			

Table 6: Suggested starting points for implementation of each circularity delivery pathway.

Delivery pathway	Common starting points
Circular Operations	
Resource Efficient and Cleaner Production [52]	• Improve process efficiencies and reduce wastage through improved planning, monitoring and control, including, as appropriate, through the application of digital technologies. • Deploy energy and water efficient techniques and practices. • Use 'fit-for-purpose' process auxiliaries that last longer and/or make processes run at highest possible efficiency. • Switch to active and passive use of renewable heat, cooling, power and fuels.
Closed Loop Systems	• Create closed water loops or use water in cascades from higher to lower quality applications. • Recover heat energy from hot (and/or cold) process streams and equipment. • Recover and reuse process auxiliaries, e.g. solvents, lubricants, etc.
Regenerative Nature Solutions	• Reduce fertilizer, pesticide and irrigation requirements with improved and/or diversified agronomy and better use of detailed and specific weather, soil, crop and other data. • Comprehensive utilization of crop residues and livestock manure. • Sequester carbon in soils (e.g. biochar).
Circular Products and Services	
Products that Last [53]	• Design for attachment and trust. • Design for durability. • Design for standardization and compatibility. • Design for ease of maintenance and upgradability. • Design for disassembly and reassembly.
Products that Flow [54]	• Design for slowing down (keeping the product value as long as possible). • Design for ease of flow management (facilitating reverse logistics, separation and sorting, and materials recycling).
Circular Services	• Design for extended service use. • Design for resource efficiency of services (minimization of the need to use resource-intensive inputs, such as energy, travel, logistics, data, etc.). • Design for waste minimization from service delivery (e.g. food, single use plastic and other products, etc.).
Circular Packaging [55]	• Design for sustainable materials sourcing. • Design for optimized resource use (in packaging systems). • Design for environmentally sound and safe packaging use phase. • Design for prolonged packaging use (e.g. reuse, refill, repair, etc.). • Design for recycling of packaging materials.

52 See e.g.: UNEP (2010), Promoting Resource Efficiency in Small and Medium Enterprises: industrial training handbook, United Nations Environment Programme, https://wedocs.unep.org/handle/20.500.11822/33337 and UNIDO and UNEP (2010), Enterprise-Level Indicators for Resource Efficiency and Pollution Intensity: a primer for small and medium enterprises, United Nations Industrial Development Organization and United Nations Environment Programme, https://www.unido.org/sites/default/files/2010-12/SME_Indicator_Primer_0.pdf.

53 Bakker, C, den Hollander, M, and van Hinte, E (2019), Products that Last: product design for circular business models, BIS Publishers.

54 Haffmans, S, Van Gelder, M, van Hinte, E and Zijlstra, Y (2018), Products that Flow: circular business models and design strategies for Fast-Moving Consumer Goods, BIS Publishers.

55 Fayole, C, Fedrigo, D, Koniecka, K and Popescu, I (2019), Applying eco-design principles to plastics in the circular economy, http://ecostandard.org/wp-content/uploads/2019/06/APPLYING-ECODESIGN-PRINCIPLES-TO-PLASTICS.pdf

Circular Inputs	
Circular Materials	• Ensure all materials are either reusable and/or recyclable or compostable at their end-of-use. • Eliminate substances of concern (e.g. those that pose a health or environmental hazard or interfere with high quality reuse or recycling). • Substitute virgin materials with recycled materials (e.g. plastics, paper, metals, glass, textiles and other materials). • Substitute non-renewable materials with sustainably-sourced renewable (bio)materials. • Substitute new parts or subassemblies with refurbished or remanufactured ones. • Source locally, using appropriate, efficient and reusable packaging and logistics.
Circular Water	• Use secondary water sources (e.g. recycled cooling or process water, harvested rainwater, treated industrial and/or municipal sewerage). • Source 'fit-for-purpose' water (i.e. meeting but not exceeding necessary use' requirements).
Circular Energy	• Switch to renewable power and thermal energy (solar, bio-, wind, hydro, geothermal, etc.). • Deploy passive heating, cooling, ventilation and lighting building designs and techniques. • Recover and reuse available secondary thermal (hot or cold) energy sources (e.g. cooling water, flash steam, condensate, product flow) for moderate temperature applications.
Circular Outputs	
Resource Recovery	• Repair, refurbish and/or remanufacture products, components and parts for a successive use cycle by same or different users. • Material sorting and recycling (mechanical, chemical, thermal, biological, etc.) into material with same, better (upcycling) or lower (downcycling) material properties and usability. • Energy and nutrient recovery from organic-rich byproducts, wastes and effluents.
Zero Waste (to landfill and incineration)	• Waste minimization through resource efficient and cleaner production and improved materials selection, procurement and production planning. • Repurposing of dead-stock and cut-offs (directly on-site or by third party producers). • Industrial symbiosis: recovery and reuse or recycling of the company's waste (including water and energy) as substitute input for another – neighbouring - company.
Zero Discharge (of – hazardous – pollutants and chemicals)	• Zero out the use of chemicals of concern, by eliminating the need for their use or replacing with safer chemical substitutes. • Zero out the generation of hazardous pollutants during operations and in supply chain, by improved process controls, substitution of chemical processes, and/or better process equipment (green chemistry and engineering). • Prevent the release of pollutants and chemicals of concern, by capture and subsequent environmentally sound reuse, recycling or destruction.

3.2. Pivot

A pivot generally happens once a business completely changes the way in which it does something. In the context of circularising business, a pivot is aimed at designing and developing circular product, service or process innovations that are unique and impactful to the company and showcase circularity ambition. This complements efforts to adapt circularity solutions found elsewhere (as outlined in activity 3.1). The pivot involves the application of systematic design thinking and methods with a profound Circular Economy lens; in other words, guiding the design and development process with a RETHINK-mindset to deliver novel, more resource efficient and circular products, services or processes.

3.2. Pivot	
Purpose	To design, develop and release novel, impactful circular product, service and/or process innovations.
Description	Application of systematic design principles and methods driven by the ambitious Circular Economy practice of RETHINK to develop, make and release novel product, service and/or process innovations.
Procedure[56]	1. Understand current circularity. 2. Define the circular innovation. 3. Make the circular innovation. 4. Release the circular innovation.

The generic pivot approach is further outlined below. However, this remains open for further customization to the specific opportunities and needs of the company and building on the company's own methods and experiences in undertaking innovation and development activities.

1. *Understand current circularity*: analyse the existing product, service or process with a Circular Economy lens to establish its strengths, weaknesses, opportunities and threats. Consider what materials and other resources are used and how these are produced and disposed at the end of their useful life. Shift focus from - product - features to the services these provide and seek feed-back from customers and other users whether and why these are valued. Explore if similar services exist in nature and how these function. If so, what drives the intensity and duration of their use and could this be mimicked in a man-made product or process?
2. *Define the circular innovation:* think outside of the box to identify and explore alternative designs that can deliver a similar service while requiring less materials and/or other natural resources, to an equal or better satisfaction of the end-users. Use established design and creativity techniques, to explore key questions like: How can the product's or process' service be delivered differently with using less '*stuff*' (materials, energy, water, space, transport, data, etc.)? How can product use be prolonged or intensified? How can the product, service or process be changed to improve and close the recovery of all materials? Combine different ideas into preliminary circular innovation concepts, or even just sketches, and explore how these may impact customer experience, business model, value chains and material flows. Select one or a few with the best overall potential to study and develop further.
3. *Make the circular innovation:* proceed with detailed design and development of the prioritized concept(s), using established design and development methods, performed with a strong Circular Economy lens. Brainstorm different ways the concept can be operationalized, and seek feed-back from future users to further refine the concept. Develop with materials that are renewable or recycled, and make sure these can easily be reused, recycled or composted. Minimize the necessary use of materials, energy and water, for the product, its manufacturing as well as in the entire life-cycle. Make, review and revise – simple – prototypes, e.g. by using 3D printing. Synthesize the findings into a finalized product, service or process design and promote it for market release.
4. *Release the circular innovation:* continue towards the actual production and release of the circular innovation in the market. Elaborate a specific go-to-market strategy, targeting specific first users with a business model and offering that suits them. Make sure to have mechanisms in place to record their experiences and learn from these for further finetuning of the innovation. Craft an authentic and trustworthy narrative that highlights the specific circularity and other attributes of the innovation. And consider how the organization can align to this narrative (see also activity 4.2).

Analysis Sheet 3.2 can be used as a proforma for recording progress of a Pivot.

56 Adapted from EMF and EDEO (2024), *Circular Design Guide*, Ellen MacArthur Foundation and IDEO, https://www.ellenmacarthurfoundation.org/circular-design-guide/methods

Analysis Sheet 3.2: Pivot

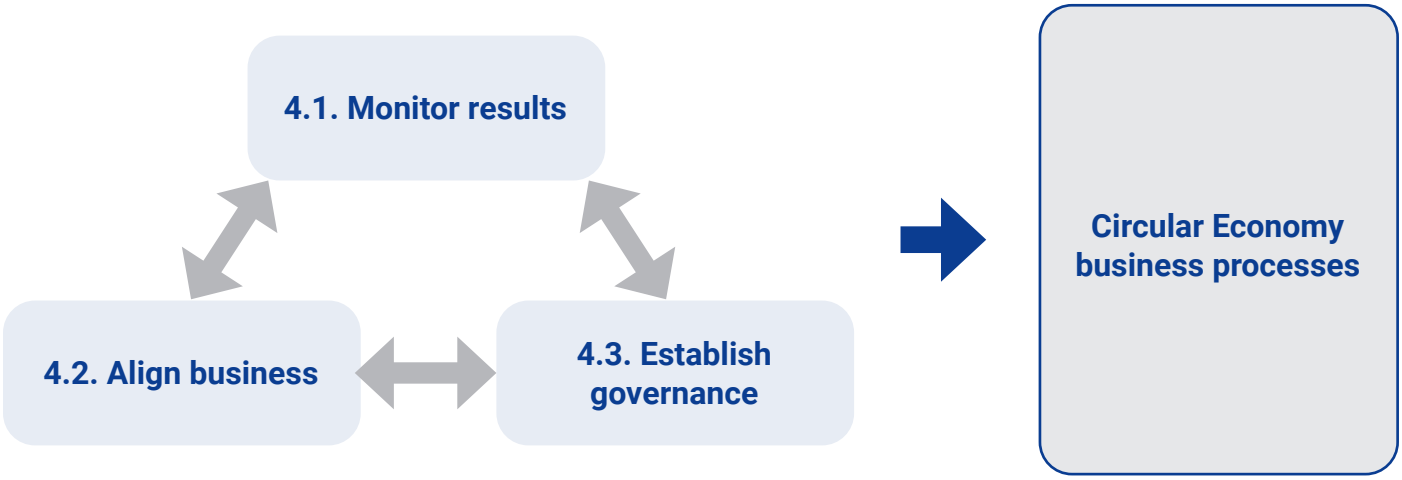
Activity	Summary of findings	
1. **Understand circularity (current product, service and/or process)**	Strengths:	Weaknesses:
	Opportunities:	Threats:
2. **Define the circular innovation**	Circularity attributes: 1…….. 2…….. 3…….. .	Sketch
3. **Make the circular innovation**	Consider e.g.: • Select materials that are renewable or recycled and suitable for reuse, recycling and/or composting. • Minimize the total consumption of materials, energy and water, in product and over its lifecycle. • Prolong and intensify the use. • ……	
4. **Release the circular innovation**	Address: • Go-to-market strategy. • End-user feed-back and learning. • Narrative about the circularity features. • Alignment of the organization with the circularity offer. • ……	

3.4. Integration

As a complement to, and possibly a continuation of, the development and implementation of specific Circular Economy solutions (as covered in cluster 3 Delivery), the 'Integration' activities are aimed at adapting and aligning the business' management processes and governance to the Circular Economy ambition. This aims to mainstream Circular Economy ambitions and concepts into those business processes that are driving business growth and development, including key decisions on products, services and operations and investments.

The key functional activities for integration of Circular Economy are: monitoring of results - to discharge accountability for the circularity efforts and to provide momentum for further circularisation of the business; alignment of business processes – to make circularity a part of the day-to-day operations and management of the company; and establishment of governance – to define roles and assign responsibilities within the company. Done properly, these three create strong incentives and effective and efficient mechanisms for continuous improvement in the adoption of Circular Economy (as depicted in Figure 11).

Figure 11: Cluster 4: Integration – overview of activities.



4.1. Monitor results

Monitoring of results is critical for starting and sustaining continuous advancement towards circular business ambition. Specifically, it provides evidence for the costs, revenues and environmental gains made with each circularity solution that is implemented as well as an indication for the importance of the company's circularized products and services to the overall performance of the business.

4.1. Monitor results	
Purpose	To monitor the results of Circular Economy adoption on the business and as contribution to the Circular Economy.
Description	The collection and analysis of financial and physical information on the company to assess progress and impact of its Circular Economy activities, particularly on the company's overall performance and for its contribution to the Circular Economy.
Procedure	1. Progress of circular solutions. 2. Impact on business. 3. Contribution to Circular Economy.

Specifically, the activities involve:

1. *Progress of circular solutions:* establish and maintain a tally of the company's specific Circular Economy initiatives, and regularly monitor the costs and revenues of each, along with an appropriate environmental impact metric. As the circular solutions will have very diverse impacts on materials and resource use, select one appropriate environmental key performance indicator unique for the respective circular solution, e.g. volume of waste diverted to recovery and secondary use; avoided Greenhouse Gas (GHG) emissions; or material, water and/or energy savings. Sum up the business results on an annual basis and/or on a cumulative basis from the formal start of the circularity activities of the company. Part 1 of Analysis Sheet 4.1A provides a pro-forma for monitoring for specific circular solutions, which can be easily adapted to the specific company needs.
2. *Impact on business:* determine the relative contribution of products and services that have circularity features incorporated in the company's portfolio, in its new product or service launches and in its total turnover. Determine first what the company itself considers a 'circularized' product or service, with reference to its Circular Economy ambition or inclusion of circularity features. Next, divide the company's offerings into the 'circularized' and 'non-circularized' category, and document the category listings. Be realistic and avoid the temptation of greenwashing! - for example, steel, aluminium, cardboard, glass etc. have in most markets historically already very high recycled contents, without any effort of the company

using these materials, hence do not claim using recycled contents aluminium or other common materials as a company achievement! Finally determine the numbers of circular products and services, the number of new circularized launches and the turnover generated by these. Comparing to the respective totals for the company, this yields proxy indicators for the importance of circularized products and services to the performance of the company. Use Part 2 of Analysis Sheet 4.1 to document the overall findings.

3. *Contribution to Circular Economy:* reassess the circularity gap of the company, as per activity 1.2, to determine progress in key indicators for resource circularity, resource efficiency and resource substitution.

Analysis Sheet 4.1: Monitor results

Part 1: Progress of circular solutions			
Circular solutions implemented	**Business impact**		**Contribution to the Circular Economy**
	Cost	**Revenue (annual)**	
1……			
2……			
3……			
Total	∑	∑	Cannot be summed up.
Part 2: Impact on business			
Indicators	**Circularized (*)**	**Total**	**Circularity share (%)**
1. New product/service launches (# of launches/yr)			
2. Product and service portfolio (# of products or services)			
3. Business turnover (e.g. MUSD/yr)			

(*) Refers to the number of - or turnover generated by – products or services that have circularity designed-in.

4.2. Align business

The Circular Economy foresees a transformation of the way the company sources and uses materials and other natural resources. Such circular business transformation happens when the Circular Economy ambition is mainstreamed into the day-to-day business processes and the company's decision making, which are driven by company's vision and mission, even where these are tacit or implicit, and the existing strategies and management systems for their implementation and oversight. The business alignment therefore focuses on embedding the Circular Economy ambition in the company's vision and mission, revising the value creation or business model and converting – linear – value chains into - multi-directional - value networks.

4.2. Align business	
Purpose	To embed Circular Economy into key processes and systems that drive the activities and decisions of the company.
Description	The establishment of Circular Economy as a performance area in the company's vision, mission and associated strategies, plans and management system(s), and subsequent alignment of the value creation model and network.
Procedure	1. Embed Circular Economy ambition. 2. Align value creation model. 3. Extend value network.

Aligning business to the Circular Economy, involves principally:

1. *Embed Circular Economy ambition*: the consideration of business opportunities and environmental concerns frames the ambition benchmarks for circular operations, products and services, inputs and outputs that, in turn, informed the company ambition (cluster 2, Ambition). The ambition is thus de-facto an addition to the company's vision and mission. The ambition may however not be fully consistent with the existing vision and mission, risking the future sidelining of Circular Economy by the company. Therefore, start with a review of the current vision and mission statements. Keep in mind that the vision is aspirational and describes the company's desired future state, providing inspiration and long-term direction. On the other hand, mission defines the company's purpose, what it does and how it achieves its goals in the present or near future. To embed Circular Economy, review the current mission and vision. Is sustainable sourcing and circular use of materials and other resources covered and what alternative or additional elements could be added to reflect the Circular Economy ambition? The result can be captured in Part 1 of Analysis Sheet 4.2. Once vision and mission duly reflect the Circular Economy ambition, ensure that the revised vision and mission statements are utilized for the next iteration of the planning cycles for the – quality, environment and/or other – management systems. This will bring the circularity ambition and solutions into the company's established management plans, reporting and auditing cycles.
2. *Align value creation model*: at its core, a value creation - or simply business - model explains how the business generates its earnings. It is customary to use a business model canvas as reference. The canvas[57] considers the key features of the business model, particularly the value proposition (what is of value to the consumer), the key activities and business resources (what the company needs to do), the customer segments, relationships and channels (how the company reaches and interacts with target customers), costs and revenues (for the company) and its partnerships. The circular business transformation will benefit from a reflection and potential adjustment, taking the circularity ambition as a reference (as indicated in Part 2 of Analysis Sheet 4.2). The changes may be an incremental refinement, or involve a reformulation of the value proposition as for example captured in alternative, circular business models, such as: products-as-a-service; circular supplies; product life-extension; sharing platforms; and resource recovery[58].
3. *Extend value network*: whereas the linear economy is running with one-way value chains based on business transactions, the Circular Economy runs on two- and often multiple-way value creation networks. These are not limited to firms, but could critically depend on other entities, such as non-related sectors and value chains, local government (for waste collection and reverse logistics), farmers and foresters (nature regeneration), knowledge-based institutions and community groups. Partners in the extended value network collaborate to develop and implement circular solutions that rely on secondary resource streams as well as the knowledge and expertise of the different partners. To get started, define

57 Osterwalder, A Pigneur, Y, and Clark, T (2010), Business Model Generation: a handbook for visionaries, game changers and challengers, John Wiley & Sons, New York.
58 WBCSD (2017), CEO Guide to Circular Economy, World Business Council for Sustainable Development, Geneva, https://www.wbcsd.org/resources/ceo-guide-to-the-circular-economy/.

the value proposition for the network collaboration; what materials and other – secondary - resources are covered, from what sources and for what applications, and what kind and scale of infrastructure and (reverse) logistics would be required (e.g. materials sorting, remanufacturing, recycling, etc)? Next, establish the shared objective, strategy and plan, jointly with key network participants, partners and stakeholders. Transcribe these into appropriate governance, management structure and business model to mobilize the investment to establish and run the necessary infrastructure that creates value for all network participants. The key decisions can be documented in Part 3 of Analysis Sheet 4.2.

Analysis Sheet 4.2: Align business

Part 1: Embed Circular Economy ambition (vision and mission statement)		
Element	**What is currently stated on sustainable sourcing and circular use of materials and other natural resources?**	**What can be changed or added to duly reflect the company's Circular Economy ambition?**
Vision *(inspirational, reflects company's desired future state)*		
Mission *(purpose, activities and goals for present and near future)*		
Part 2 Align value creation model		
Element[59]	**Is the sustainable sourcing and circular use of materials and other natural resources considered? If so, how?**	**What can be changed or added to duly reflect the company's Circular Economy ambition?**
Value proposition		
Key activities		
Key business resources		
Customer segments		
Customer relationships		
Channels		

59 Further guidance can be found in: ISO (2024), ISO59010: Circular economy: Guidance on the transition of business models and value networks, International Organisation for Standardisation, Geneva.

Costs		
Revenues		
Partners		

Part 3: Extend value creation network	
Activities[60]	**Summary description**
Define shared value proposition (materials, source and applications and infrastructure requirements)	
Establish shared objective, strategy and plan	
Define governance, management and business model	
Invest, establish and run necessary infrastructure to the benefit of all network partners	

4.3. Establish governance

Governance covers the structures, processes and rules for decision making and provides the management framework to ensure that strategy and action plans, including for Circular Economy, are implemented across all parts of the company. Top level commitment is essential, yet only effective when translated into specific roles and responsibilities for relevant corporate functions, including top management, production, environment and sustainability, research and development, finance and marketing. And collaboration procedures and circularity relevant competencies developed.

60 Further guidance can be found in: ISO (2024), ISO59010: Circular economy: Guidance on the transition of business models and value networks, International Organisation for Standardisation, Geneva.

4.3. Establish governance	
Purpose	To assign responsibilities and create organisational capacities to ensure effective, company-wide alignment with and execution of the Circular Economy ambition.
Description	The break-down of the company's Circular Economy activities, assignment of roles and responsibilities, and creation of the organisational capacities for their execution and monitoring across the entire company.
Procedure	1. Define organizational structure and responsibilities. 2. Develop requisite organizational capacities.

Consider the following to create effective and efficient governance[61].

1. *Define organisational structure and responsibilities:* starting from the top, identify which departments or functions are critical to the success of Circular Economy in the company: who leads and decides on the Circular Economy (normally starting at executive level)? who executes and coordinates the circularity initiative (could e.g. be sustainability or R&D department)? who implements the circular solutions (could be a diversity of departments, depending on the solutions considered, e.g. procurement, product development, production, etc)? and who supports analysis, monitoring and implementation (potentially all functions)? And check for completeness by walking through the ambition and delivery pathways – are all necessary functions for each relevant delivery pathway covered? Among the identified functions, who are most critical and can be brought into a working group of task force, keeping the others informed and involved on an as needed basis. Consider whether separate lead groups might be useful to take charge of e.g. circular pivots or other major tasks that cannot be effectively combined with other responsibilities. Part 1 of Analysis Sheet 4.3 can record key details of the governance structure.
2. *Develop requisite organisational capacities*: a crucial success factor is inoculating a Circular Economy mindset in the hearts and minds of the workforce, through such activities as knowledge building, incentive systems, effective internal communication structures and encouraging internal collaboration. As with any change, resistance is to be expected and its root causes, whether scepticism or genuine technical or operational concern, are to be explored and addressed. Identify which specific knowledge is needed in which areas and promote skill-building among employees, to nurture a company culture of continuous learning and innovation. Consider ways to incentivize and reward employees for specific contributions that further advance the company's Circular Economy ambition. Part 2 of Analysis Sheet 4.3 provides a pro-forma to collate and consolidate the different capacity building measures.

61 Valuable additional guidance can for example be found in: Ernesto, M; Mazure, D; Patzelt, D; Schimmelpfeng, L and Tauer, R (2025), Strategy Guide: Circular Economy; a step-by-step guide to becoming an impact-oriented company in a circular economy, Global Compact Network Germany, https://www.globalcompact.de/mediathek/publikationen/publikation/strategy-guide-circular-economy

Analysis Sheet 4.3: Establish governance

Part 1: Organisational structure and responsibility		
Role function	**Who?**	**What is the specific responsibility?**
LEAD *(provide direction & decide)*		
EXECUTE *(coordinate, oversee, monitor)*		
IMPLEMENT *(circular economy activities)*		
SUPPORT *(undertake specific sub-tasks)*		
Part 2: Develop requisite organisational capacities		
Intervention areas	**Summary of actions to be taken**	
Building Circular Economy knowledge base		
Improving communication and collaboration		
Training and skill-building		
Addressing resistance to change		
Providing incentives and rewards		

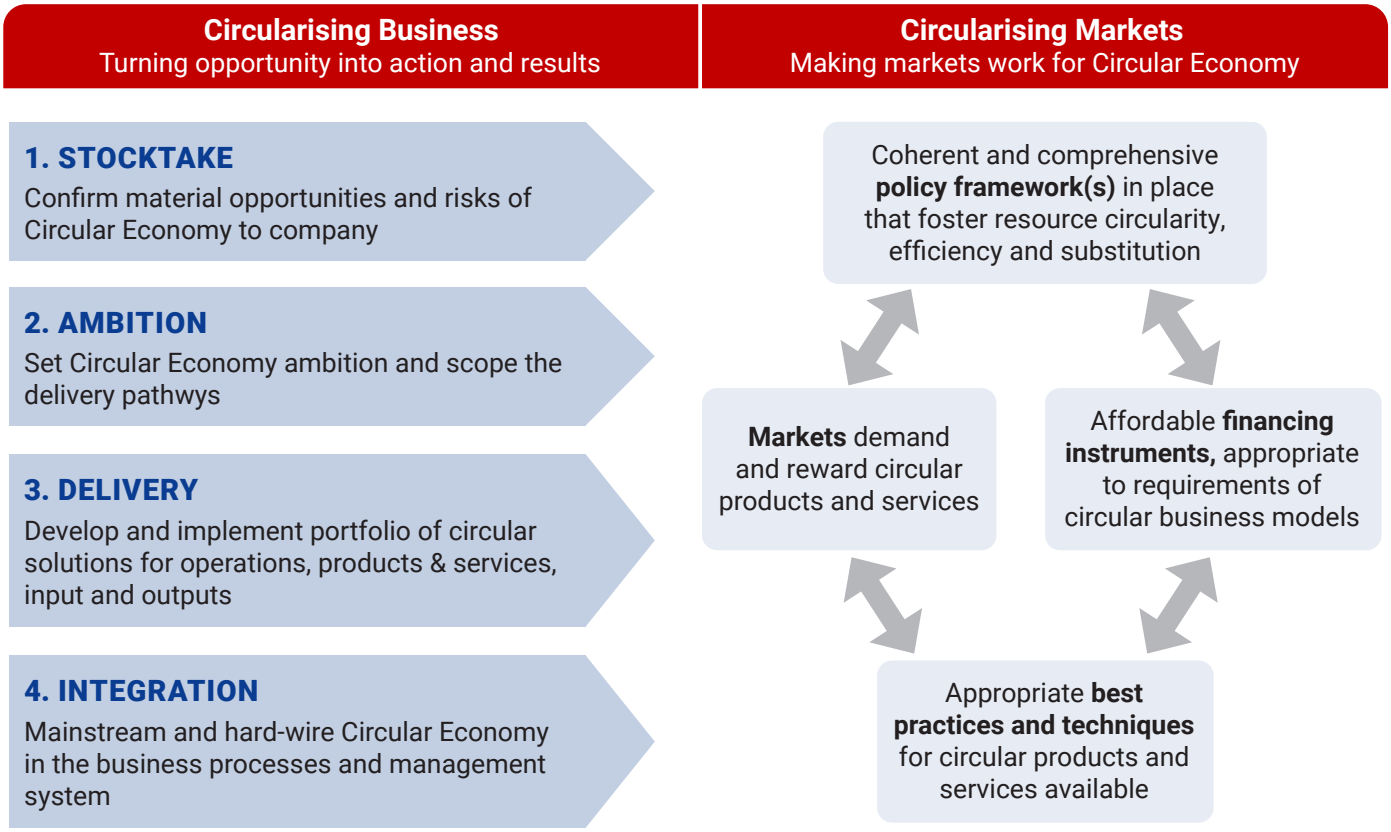
Going Circular is a multi-facetted undertaking unique for every business that does not lend itself well for a one-size-fits-all roadmap.

Instead, businesses stand to benefit from considering a menu of activities that each contribute to advancing circular business, here organized in the four SADI clusters: Stocktake, Ambition, Delivery and Integration.

Companies can combine activities across these clusters and undertake these in a manner adapted to the company's opportunities, experiences and established processes and procedures, whilst maintaining a strong Circular Economy lens.

CHAPTER 4: CIRCULAR ECONOMY THROUGH MARKETS

The Circular Economy presents a promising innovation and sustainable development opportunity for business, climate and planet, and people and societies. This opportunity is though limited by the constraints of current markets on the one hand and the level of ambition and competencies of business on the other hand. Both these sides can move forward to make markets work for the Circular Economy, and unleash Circular Economy as pathway for ambitious climate action and sustainable consumption and production.



This dual track approach involves circularising markets and circularising business. On the left, businesses turn existing and emerging opportunities into action and results, by undertaking the relevant activities from the SADI menu: Stocktake, Ambition, Delivery & Integration (as elaborated in in Chapter 3). On the right, government and the business support ecosystem develop, implement and monitor consistent and predictable policy, avail appropriate knowledge, standards, technology to nurture market demand for circular goods and services.

4.1. Market development

The Circular Economy is already firmly on the policy agenda in Southeast Asia through regional and national initiatives. The central tenet is to foster Circular Economy through market transformation and active engagement and leadership of business and other stakeholders. Business is to position itself for markets and enabling policy and related business ecosystems that will further reward demonstrable circularity performance in years to come.

The 2021 ASEAN Circular Economy Framework[62] recognises the pivotal role of Circular Economy for the ongoing regional economic integration, to contribute to resilient economy, resource efficiency and sustainable growth. The Framework centres on the creation of a conducive ecosystem for circular products and services, through: (1) standards harmonization and mutual recognition of circular products and services; (2) trade openness and facilitation in circular goods and services; (3) use of innovation and emerging technologies for greening the supply chain; (4) access to financing for green projects; and (5) efficient use of energy and other resources. The complementary 2023 ASEAN Sustainable Consumption and Production Framework[63] further supports the Circular Economy with its focus on sustainable products and (public) procurement and promotion of sustainable consumption and lifestyles in urban and regional settings.

By 2025, this ASEAN Circular Economy Framework is already further supported by specific Circular Economy roadmaps or action plans in seven Member States, particularly:

1. Cambodia Circular Economy Strategy and Action Plan [2021][64];
2. Indonesia National Roadmap and Action Plan for Circular Economy 2025-2045 [2024][65];
3. Circular Economy Strategies for Lao PDR [2017][66];
4. Circular Economy Policy Framework for Manufacturing in Malaysia [2024][67] and Circular Economy Blueprint for Solid Waste Malaysia 2025-2035 [2024][68];
5. Singapore Zero Waste Masterplan [2019][69] and Singapore Green Plan [2021][70];
6. Thailand Bio-Circular-Green (BCG) Economy Policy [2021][71]; and
7. Vietnam National Action Plan to Implement Circular Economy by 2030 [2025][72].

There is great diversity in approach, scope, ambition and instruments among these. Broadly speaking five of these national roadmaps address Circular Economy as an economic transformation with a focus on priority sectors (Malaysia (circular manufacturing)), provisioning systems (Singapore (Green Strategy)), lighthouse opportunities (Laos) or the economy at large (Thailand and Vietnam). The other four national strategies are primarily concerned with sustainable waste management and either take a waste value chain approach (Cambodia and Singapore (Zero Waste)) or a Circular Economy principles approach (Indonesia and Malaysia (Waste Blueprint)). Thailand most profoundly articulated a localized Circular Economy concept as the Bio-Circular-Green Economy that is deeply rooted in the country's sufficiency philosophy.

These action plans and roadmaps, complement Circular Economy relevant policy provisions in other policy documents, including the national Sustainable Consumption and Production plans (developed in accordance with target 12.1 of the Sustainable Development Goals) and specific laws and regulations, for example on sustainable (or green) public procurement (e.g. Laos, Malaysia, Philippines, Thailand and Vietnam)[73], waste management and climate change (e.g. Indonesia) and Extended Producer Responsibility (e.g. Philippines, Malaysia and Thailand)[74].

62 AEC. (2021). Framework for Circular Economy for ASEAN Economic Community. Jakarta: ASEAN Economic Community. https://asean.org/wp-content/uploads/2021/10/Framework-for-Circular-Economy-for-the-AEC_Final.pdf

63 ASEAN & SWITCH-Asia. (2023). ASEAN Sustainable Consumption and Production Framework. ASEAN Working Group on Environmental Education and SWITCH-Asia. https://environment.asean.org/public/uploads/repositories/20230717-asean_scp_framework_summary_final.pdf

64 NCSD. (2021). Circular Economy Strategy and Action Plan. Phnom Penh: National Council for Sustainable Development. https://www.undp.org/sites/g/files/zskgke326/files/2022-06/Circular%20Economy%20Strategy%20and%20Action%20Plan%202021%20%282%29.pdf

65 BAPPENAS. (2024). Circular Economy Strategy and Action Plan 2025 - 2045. Jakarta: BAPENAS - Ministry of National Development Planning Agency. https://lcdi-indonesia.id/wp-content/uploads/2024/07/RAN-ES-2025-2045.pdf

66 MNR. (2017). Circular Economy Strategies for Lao PDR. Vientiane: Ministry of Natural Resourcess, https://www.undp.org/sites/g/files/zskgke326/files/publications/undp-lecb-circular-economy-strategies-for-laos-pdr-20170911_0.pdf.

67 MITI. (2024). Circular Economy Policy Framework for Manufacturing in Malaysia. Ministry of Investment, Trade and Industry. https://www.nimp2030.gov.my/nimp2030/resources/NIMP Banner/CIRCULAR_ECONOMY_POLICY_FRAMEWORK.pdf;

68 MHLG. (2024). Building a Prosperous Future: Circular Economy Blueprint for Solid Waste 2025-2035. Ministry of Housing and Local Government. https://www.kpkt.gov.my/kpkt/resources/user_1/GALERI/PDF_PENERBITAN/BLUEPRINT/BLUEPRINT_EKONOMI_KITARAN_SISA_PEPEJAL_DI_MALAYSIA_2025_2035.pdf?mid=740

69 MEWR (2019), Zero Waste Masterplan Singapore, Ministry of Environment and Water Resources, https://isomer-user-content.by.gov.sg/23/85029cae-9ba1-4144-8a52-26c7f86c04ba/zero-waste-masterplan.pdf

70 https://www.greenplan.gov.sg/

71 Dharmapiya, P. (ed) (2020). Thailand's BCG Transformation: 40 case studies on the bio-circular-green strategy and the sufficiency economy philospohy in action. Bangkok: National Institute of Development Administration. https://sudsesc.nida.ac.th/main/images/books/Thailand%E2%80%99s%20BCG%20Transformation.pdf; Edyveana, R., Apiwatanapiwat, W., Vaithanomsat, P., Boondaeng, A., Janchai, P., & Sophonthammaphat, S. (2023). The Bio-Circular Green Economy model in Thailand: a comparative review. *ANRES: Agricult. & Nat. Resourc., 57*, 51-64

72 PM(V). (2025). Introducing the National Action Plan for Circular Economy Implementation by 2025 (decision no 222/QD-TTg). Hanoi: Prime Minister (Vietnam)

73 See e.g.: https://www.switch-asia.eu/our-work/multi-country/green-public-procurement/

74 See e.g.: https://www.switch-asia.eu/our-work/multi-country/enabling-effective-extended-producer-responsibility-epr-systems/

Across the ongoing and announced policy initiatives in Southeast Asia, there is convergence to foster business and stakeholders' participation and operationalize green or sustainable public procurement and Extended Producer Responsibility (EPR) to create markets for circular products and services. Creating and implementing consistent Circular Economy policy and regulations is foundational for leveraging markets as driver for Circular Economy. However, further efforts are needed, in particular to create the supportive business ecosystem for Circular Economy to ensure businesses can prepare for and adapt to the changing policies and requirements. The business support ecosystem may focus to:

- Develop, promote and facilitate the adoption of appropriate best practices and innovations for circular products, services, technologies and value chains. This can follow a dual track, focusing on respectively the widespread adaptation and adoption of existing circularity solutions and on creating innovation capacity to pivot transformative circularity innovations. A key challenge is ensuring technical competence and impartiality of technical assistance services and capitalising on available domestic best practices and innovations to build trust with the business sector.
- Ensure fair market access and competition for circular products and services: businesses offering a more circular product or service require a level playing field to differentiate themselves from other businesses offering the business-as-usual product or service. This can be achieved with eco-labels, recycled contents specifications and adjustment of technical standards (e.g. to allow recycled contents materials to be used for food and beverage packaging or as building or construction material). Public procurement can aid the scaling up of such standards, labels and provisions. Furthermore, it is necessary to uproot all forms of greenwashing to eliminate unfair competition based on unverified, potentially irrelevant and misleading environmental self-declarations.
- Facilitate access to appropriate and affordable financing for circular business investments. Small and Medium Enterprises in particular find it difficult to secure financing, often as a combination of several factors, including the economic feasibility of the circularity investment, the maturity of the firm's accounting practices and the security of its assets, and potentially different business and earnings models involved. Efforts may focus on ensuring that financial instruments are appropriate to relevant types of circularity investments and make their financing affordable by specifically addressing their respective viability gap and risk profiles.

4.2. Business action

> *Even in the absence of comprehensive and predictably-implemented policy and developed markets for the Circular Economy, Southeast Asian businesses have been able to get started on Circular Economy implementation, bringing them direct business benefit whilst doing good for climate and environment, and people and communities. Get inspired and follow suit, build the necessary competencies and strategize to balance opportunities for value creation, strategic advantage and risk management.*

Circular Economy offers business a practical approach to demonstrate leadership and action through responsible and inclusive business conduct. Responsible business starts with businesses – and other organizations - taking responsibility for the impacts of its activities and decisions on environment and society, through ethical behaviour and fair business conduct. It involves mainstreaming environment and society considerations into day-to-day business operations and decision making, across relevant subject areas: good governance; environment; labour; fair operating practices; human rights; consumer issues; and community involvement. This is further elaborated in ARAIBA Code for Responsible and Inclusive Business in ASEAN[75] and relevant frameworks globally. The ARAIBA Code is supported by the ASEAN Business Advisory Council and promoted through ARAIBA Sdn Bhd – a not-for-profit business entity working to advance responsible and inclusive business in ASEAN. ARAIBA has taken the initiative for the ASEAN Circular Economy Business Alliance (ACEBA) (see box 1)

75 ARAIBA Code for Responsible and Inclusive Business in ASEAN, see: https://www.araiba.org/resource/araiba-code-for-responsible-and-inclusive-business/

ACEBA: ASEAN Circular Economy Business Alliance

ACEBA was launched in July 2024 as an ASEAN-centric, business-led Circular Economy initiative, with the endorsement of the ASEAN Business Advisory Council (ASEAN BAC), the ASEAN Secretariat, and the European Union Delegation to ASEAN. ACEBA is an initiative of ARAIBA Sdn Bhd[76], a purpose-driven, not-for-profit business organization that works to promote and facilitate responsible and inclusive business practices in ASEAN. The activities of ACEBA are further supported by a Technical Advisory under the SWITCH-Asia Policy Support Component[77].

ACEBA brings together companies and other business organizations that pledge to lead by example. These participating companies agree to (1) promote Circular Economy in their business networks and advocacy; (2) consider and adopt appropriate circularity solutions in their products and operations; and (3) share circular business achievements and experiences. ARAIBA, in partnership with national and regional business organizations, supports participating companies with accessing appropriate Circular Economy knowledge and tools and relevant circular business solutions, and promoting their achievements through knowledge sharing and networking activities.

ACEBA encourages leadership on Circular Economy by enterprises — from large corporates to Micro, Small and Medium Enterprises (MSMEs), start-ups, and social enterprises — and business associations in ASEAN Member States. Specifically, ACEBA:

- Provides visibility and voice to participating companies;
- Documents and showcases CE business practices and solutions;
- Facilitates peer-learning and sharing among participating companies and other leading businesses; and
- Promotes operational CE tools and metrics appropriate to ASEAN businesses.

ACEBA invites Southeast Asian businesses from all sectors to participate, as Circular Economy is applicable across business sectors. In its knowledge sharing and networking, ACEBA is prioritizing eight sectors that are of key economic importance in the regio, have large participation of MSMEs, and have demonstrated good circularity potential.

76 ARAIBA website: https://www.araiba.org/araiba/
77 EU SWITCH Asia (2023), Mobilising Business Action for Circular Economy in ASEAN, https://www.switch-asia.eu/our-work/multi-country/asean-circular-economy-pact-acep-mobilizing-business-action-for-circular-economy/

The ASEAN Circular Economy Business Alliance (ACEBA) uncovered and documented with the technical assistance of the EU SWITCH Asia Policy Support Component over 80 Circular Economy business cases[78]. These cover businesses ranging from micro to large and transnational, with different ownership structures, business models and histories, illustrating the business potential across different types of enterprises. Such as: circular or other start-ups; family-owned national businesses; large national business groups and (subsidiaries of) government linked enterprises; and transnational corporations spearheading circularity solutions. Moreover, these demonstrate Circular Economy opportunity across diverse sectors, such as textile and garments, building and construction, agriculture and food, and hospitality.

Across the Southeast Asian business cases, few success factors stand out. First, a sense of purpose, for conducting business responsibly in the context of worsening climate and planetary crises. This reflects an understanding of the bigger environmental and resource-constrained picture that business equally depends on and contributes to. It offers a magnetic north to guide business in its circularity transition. Second, innovation, as all businesses have succeeded to develop and launch new products or processes that significantly improved the circularity, efficiency, longevity and sustainability of the use of materials, energy, water and other natural resources in their products, business and value chains. Third, and closely linked, the use of diverse knowledges, including not just formal knowledge, but also tacit and traditional knowledge, skills, designs and culture. Fourth, as for any business or innovation, success hinges on entrepreneurial competencies, particularly opportunity seeking, calculated risk taking and leadership. Any business can work to improve its statement of purpose and its entrepreneurial acumen and access and synthesise diverse knowledges into novel products, processes and services. The proposed operational SADI guidance (Chapter 3) provides a menu of activities to do so using a strong circularity lens; Stocktake, Ambition, Delivery & Integration

Making the Circular Economy work for any company requires a tailor-made approach to best take advantage of its three-pronged business opportunity. First, make sure to start now creating value through cost savings and development of new products and new markets, that can be realized by adaptation of existing, elsewhere-trialled, circularity solutions. These could be in generic areas like: energy and resource efficiency; product and packaging design for dematerialization and circularity; switching to readily-available recycled materials and recovered water; and using available renewable energy solutions (as elaborated further in activity 3.1). Second, position the company to take a strategic advantage by preparing to do business in a circular future. Consider pivoting into ambitious circular products or services (as elaborated further in activity 3.2). Policy and markets are on track to circularise further, so position the company to take advantage. Thirdly, accept that '*business as usual*' is increasingly '*business of the past*': the world is changing rapidly and climate, water, nature, supply, reputational and other risks are real. Avoid being left behind by investing in understanding the changing world and its impacts on the present and likely future performance of the company. Start with regularly revisiting and recalibrating the analysis of the business context (activity 1.1 provides some starters).

As Circular Economy concepts, practices and policies develop rapidly, make sure to stay connected and informed, for which a number of sources are suggested in the annex. Engage with the ASEAN Circular Economy Business Alliance[79] and other circular business initiatives as suits the company. Get inspired by what others have already achieved and inspire others with the company's experiences and achievements. Together, business can make a difference and lead an ASEAN-centric Circular Economy transition that supports the ambition of a resilient, innovative, dynamic and people-centred ASEAN (as set forth in the ASEAN Community Vision 2045).

Join the Alliance

Contribute a Business Case

Join the Mailing List

Other Inquiries

78 ACEBA (2024 - 2025), Circular Economy business cases from Southeast Asia, ASEAN Circular Economy Business Alliance, https://www.aceba.co/business-case.

79 See: www.aceba.co

The future of irreversible climate change, loss of nature, and pollution is already with us. Ignoring these signs is a risky business affair. We all need innovative, circular, and low carbon solutions, and business is in the driving seat to provide these.

Get involved and started:

one responsible step at a time business can lead the change towards Circular Economy for a sustainable future and liveable planet.

Additional resources

Learn more

- ACEBA (2024 - 2025), Circular Economy business cases from Southeast Asia, ASEAN Circular Economy Business Alliance and EU SWITCH Asia, https://www.aceba.co/business-case.
- ACEBA (2025), Framework for Business Action for the Circular Economy in Southeast Asia, ASEAN Circular Economy Business Alliance and EU SWITCH Asia, https://www.aceba.co/resource/framework-for-business-action-for-the-circular-economy-in-southeast-asia/
- BAPPENAS (2022), The future is circular: uncovering circular economy initiatives in Indonesia, Ministry of National Development Planning Agency (BAPPENAS) with United Nations Development Programme, Jakarta, https://www.undp.org/sites/g/files/zskgke326/files/2023-03/The%20Future%20is%20Circular%20UNDP-BAPPENAS%20%28English%20Version%29.pdf
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- Ernesto, M; Mazure, D; Patzelt, D; Schimmelpfeng, L and Tauer, R (2025), Strategy Guide: Circular Economy; a step-by-step guide to becoming an impact-oriented company in a circular economy, Global Compact Network Germany, https://www.globalcompact.de/mediathek/publikationen/publikation/strategy-guide-circular-economy
- ISO (2024), ISO59004: Circular economy: Vocabulary, principles and guidance for implementation, International Organisation for Standardisation, Geneva.
- ISO (2024), ISO59010: Circular economy: Guidance on the transition of business models and value networks, International Organisation for Standardisation, Geneva.
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- WBCSD (2017), CEO Guide to Circular Economy, World Business Council for Sustainable Development, Geneva, https://www.wbcsd.org/resources/ceo-guide-to-the-circular-economy/.
- WBCSD (2023), Circular Transition Indicators: version 4.0; metrics for business by business, World Business Council for Sustainable Development, Geneva, https://www.wbcsd.org/contentwbc/download/16345/233646/1.

Connect and engage

- ASEAN Business Advisory Council (ASEAN BAC), https://asean-bac.org/
- ASEAN Circular Economy Business Alliance (ACEBA), https://www.aceba.co/aceba/
- ASEAN Circular Economy Stakeholders Platform (ACESP), https://ce.acsdsd.org/
- Circle Economy, https://www.circle-economy.com/about
- EU ASEAN Business Council (EU ABC), https://eu-asean.eu/
- Ellen MacArthur Foundation (EMF), https://www.ellenmacarthurfoundation.org/
- EU SWITCH-Asia Programme (Sustainable Consumption and Production and Circular Economy), https://www.switch-asia.eu/
- United Nations Global Compact (UNGC), https://unglobalcompact.org/
- World Business Council for Sustainable Development (WBCSD), https://www.wbcsd.org/
- World Circular Economy Forum (WCF), https://wcef2025.com/
- World Economic Forum (WEF), https://www.weforum.org/

ABOUT

ASEAN Circular Economy Business Alliance

The ASEAN Circular Economy Business Alliance (ACEBA) is an ASEAN-centric, business-led initiative that fosters business leadership and action for the Circular Economy in Southeast Asia. ACEBA is an initiative of ARAIBA Sdn Bhd, in collaboration with national and regional business organizations, supported by a technical advisory through the EU SWITCH-Asia Policy Support Component.

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switchasia Funded by the European Union

Launched in 2007, the **EU SWITCH-Asia Programme** is the single largest programmatic investment to promote and facilitate the uptake of sustainable consumption and production practices in the Asia and Pacific region. Under the current phase of its Policy Support Component (PSC), SWITCH-Asia lends advisory support to multi-country and sub-regional initiatives on policy and practices for Sustainable Consumption and Production and their contribution to Circular Economy and achievement of Nationally Determined Contributions to the Paris Climate Agreement.

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ARAIBA

ARAIBA Sdn Bhd is a not-for profit business organization that promotes responsible and inclusive business in Southeast Asia. ARAIBA is the custodian of the Code for Responsible and Inclusive Business, developed by its predecessor ASEAN CSR Network in collaboration with the ASEAN Business Advisory Council. This Code calls on business and other organization to take responsibility for the impacts of its activities and decisions on society and environment, with a view to support sustainable development. This includes consideration of business and industry contributions to mitigate the triple planetary crisis and opportunities this presents through resource efficiency and Circular Economy - actions that cannot be seen independently from other core social responsibility subjects, particularly organizational governance, adoption of fair operating practices, labour, and community engagement and development.

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