منتدى الاستراتيجيات الأردني
JORDAN STRATEGY FORUM

Circularity: Jordan's Opportunity to Promote Economic Growth

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The Jordan Strategy Forum (JSF) is a not-for-profit organization, which represents a group of Jordanian private sector companies that are active in corporate and social responsibility (CSR) and in promoting Jordan's economic growth. JSF's members are active private sector institutions, who demonstrate a genuine will to be part of a dialogue on economic and social issues that concern Jordanian citizens. The Jordan Strategy Forum promotes a strong Jordanian private sector that is profitable, employs Jordanians, pays taxes and supports comprehensive economic growth in Jordan.

The JSF also offers a rare opportunity and space for the private sector to have evidence-based debate with the public sector and decision-makers with the aim to increase awareness, strengthening the future of the Jordanian economy and applying best practices.

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1. The Circular Economy

Background

The Hashemite Kingdom of Jordan, just like most other countries, has been following a linear economic model where goods are produced by extracting resources and consumed until they finally get discarded as waste (*take-make-dispose*). However, the Jordanian economy holds great growth opportunities in circular practices, hence, should move away from linearity, which is unsustainable, and towards circularity.

A circular economy is based on natural material cycles in which waste becomes a resource for other living beings or is transformed by biogeochemical processes without harmful effects. **A circular economy is part of the green economy** and promotes a sustainable way of life that respects the planetary boundaries.

The *take-make-dispose* system has resulted in enormous amounts of waste and emissions with no intention of future economic use or value creation and has increased pressure on social and ecological systems. The extraction and refinement of natural resources alone are responsible for up to 50% of the global greenhouse gas emissions and directly linked to 90% of the biodiversity loss and water stress.[1] It is essential to reduce the consumption of energy and resources in production processes since biodiversity loss and climate collapse and global crises and threats to human survival.

The concept of the circular economy can address many of the socio-ecological challenges and, in fact, turn these into economic opportunities if implemented consistently and holistically.[2]

Humanity would need 1.75 earths to sustain the world's current rate of resource consumption which is an illustration of the worrying effects of linear economic activity. A socio-ecological transformation of the linear economic system alongside a fundamental restructuring of consumption patterns and business practices must become top priorities to enable future generations to live in dignity.

The Government of Jordan recognizes in the Economic Modernization Vision 2033 both the need and opportunity that the adoption of the circular economy holds for the

[1] https://ellenmacarthurfoundation.org/news/new-study-explores-how-the-circular-economy-can-tackle-biodiversity-loss
[2] https://www.circular-economy-initiative.de/circular-economy-roadmap-fr-deutschland

Kingdom. However, its success will depend greatly on the commitment of all stakeholders, including the government, businesses, and individuals, to embrace circular economy principles and adopt sustainable practices. The transition to a circular economy requires a fundamental shift in the way we design, produce, consume, and dispose of goods and services. This includes embracing the principles of the circular economy, such as reducing waste and pollution, reusing, and recycling materials, and creating closed-loop systems that minimize resource consumption.

In addition, the successful application of circular economy systems is a cornerstone for achieving the goals of the Paris Agreement.[3] The Circularity Gap Report by Circle Economy suggests that circular economy scenarios have the potential to reduce resource extraction by 28% and to cut global carbon emissions by 39% (2021)[4]. According to this study, the combined circular economy interventions in food, housing, mobility, consumables, healthcare, and communications sectors can almost double the current global Circularity Metric of 8.6%, bringing it up to 17%.[5]

Furthermore, it is unlikely that without a transformation to a circular economy, we can achieve the goals of the Convention on Biological Diversity. A recent study by Sitra has found that the world's biodiversity can recover levels back to the year 2000 by the year 2035, if the circular interventions in the food and agriculture, construction, textiles, and forest sectors are implemented.[6]

The Core Principles of the Circular Economy

In contrast to a linear flow economy, a circular economy focuses on preserving the value of materials in products and reducing their associated environmental impacts. Here, raw materials should be used more efficiently and effectively, products should have a longer life, waste and emissions should be avoided wherever possible, and where not possible, waste should be recycled. Where recovery of resources is not feasible, they should be used for energy recovery and kept in safe material cycles with pollutants removed.

Hence, circular economy strategies not only aim to increase efficiency, but also aim to design the economic system and all processes in the anthroposphere in a way that is compatible with nature and conserves resources.[7] It is commonly attributed to the following three core principles[8]:

[3] https://www.giz.de/de/downloads/giz2021-en-circular-econy-cornerstones-paris-agreement.pdf
[4] https://library.fes.de/pdf-files/bueros/amman/18984.pdf
[5] https://www.circularity-gap.world/2022
[6] https://www.sitra.fi/en/news/circular-solutions-can-halt-biodiversity-loss-the-food-and-agriculture-sector-can-make-the-largest-contribution/
[7] https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2020_04_27_leitlinie_kreislaufwirtschaft_bf.pdf
[8] https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview

1. Eliminate waste and pollution through reduced resource use.
2. Circulate products and materials (at their highest value).
3. Regenerate nature.

Strategies and Business Models of the Circular Economy

Every product and service start at the designing stage. In a circular value chain, final products and their components must be designed for disassembly, reassembly, recycling, as well as for durability, ease of reuse, and repair and refurbishment (see figure 1).

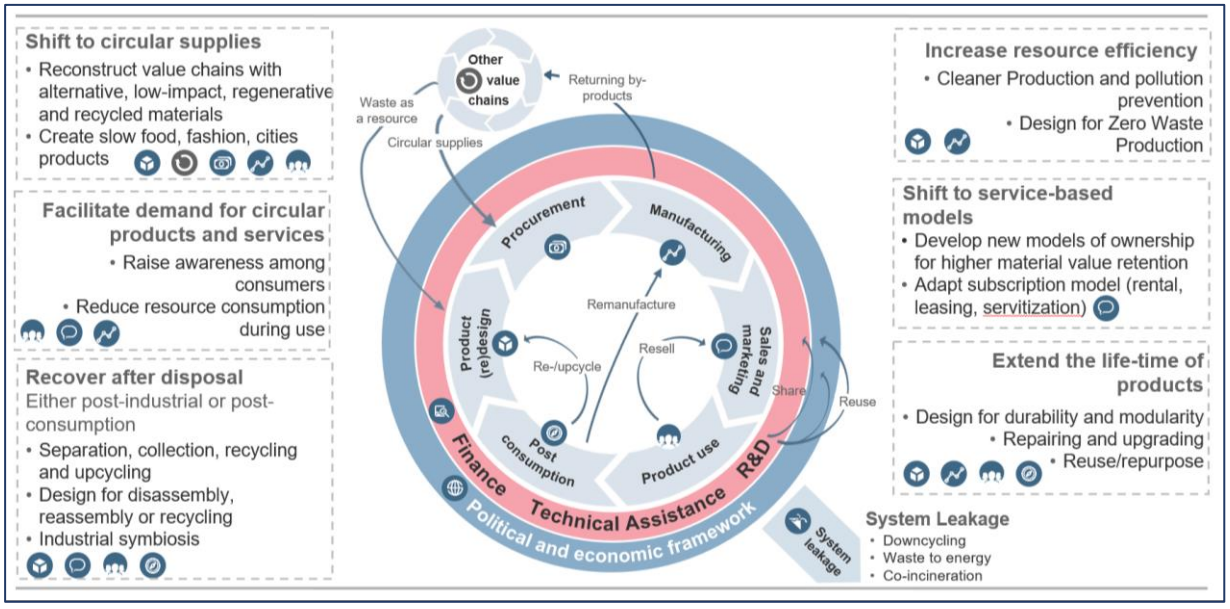

Figure 1 - Circular economy strategies and business models along value chains (Source: adelphi own based on Accenture, 2015 and MedWaves, BCSD, 2020)

A circular product chain for *durable consumer goods* aims to procure low-impact and recycled materials instead of virgin materials. By sharing, reusing, repairing, remanufacturing or, ultimately, recycling, the life cycle of materials and products can be extended, thus closing the loop.[9] In this regard, service models, which allow manufacturing companies to carry out repairs and refurbishments themselves, are an effective approach to extending the lifetime of products.[10]

***Consumables*, on the other hand, are to be placed in the biological cycle.** These materials are returned to nature and must therefore be designed to be biodegradable and harmless to the environment. This is because natural systems can only be regenerated if no substances harmful to humans or the environment are used in production or discarded in post-production processes.

[9] https://circularhub.ch/kreislaufwirtschaft
[10] https://www.umweltrat.de/SharedDocs/Downloads/DE/01_Umweltgutachten/2016_2020/2020_Umweltgutachten_Kap_03_Kreislaufwirtschaft.pdf?__blob=publicationFile&v=2

The Circular Economy's Opportunities: Job Creation and Innovation Promotion

The circular economy strategies offer an alternative path to secure a stable supply of raw materials, which increases their availability, and consequently reduces the price for consumers. This is essential in light of the persistent supply shocks caused by the COVID-19 pandemic, which resulted in significant price increases for primary, raw materials, primary products, and non-renewable energy.

Furthermore, embracing circular business models is expected to create 6 million jobs globally;[11] this means supporting industrial and craft sectors that invest in recycling, repairing, hiring, and remanufacturing. Semi-skilled and highly skilled workers are needed to support the circular business models and can also create job opportunities for the youth. A report published at the World Government Summit estimated that the **Gulf Cooperation Council (GCC) countries alone can save almost $138 billion by 2030 if they adopt the principles of a circular economy.**

Promising Sectors in the Circular Economy

1. The Construction Sector

The adoption of circular economy actions in the buildings and construction sector has the potential to create a significant number of jobs. For instance, a report by the Ellen MacArthur Foundation estimates that **transitioning to a circular economy in this environment could create up to 12 million jobs across Europe by 2030**, with most of these jobs being created in the construction, manufacturing, and waste management sectors[12]. Another report by the International Labour Organization (ILO) highlights that circular economy actions in the construction and building sector can generate employment opportunities in areas such as renewable energy installation, energy-efficient retrofitting, waste management, and smart building technologies[13].

In addition, the adoption of circular economy practices in the construction sector can also lead to cost savings and resource efficiency. For example, a study by the World Economic Forum found that **using circular economy principles in the construction**

[11] https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_628644/lang--en/index.htm#:~:text=6%20million%20jobs%20can%20be,making%2C%20using%20and%20disposing%E2%80%9D

[12] https://www.ellenmacarthurfoundation.org/resources/apply/circular-economy-in-the-built-environment

[13] https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_747548.pdf

industry could result in a reduction of construction materials by 50%, leading to cost savings of up to $630 billion per year globally[14].

2. Mining Sector

Circular economy principles, including the creation of less waste and circulation of materials at their highest value, can offer a significant contribution to resilient and more sustainable raw material supplies.[15][16] For example, it is estimated that the materials recovered from circular mining activities could cover up to 40% of the resource demand for EV batteries by 2040.[17]

3. Consumer Goods

Ideally, circular economy trends should empower manufacturers to develop consumer goods in the highest possible quality to utilise several life cycles. This allows for comprehensive repair, reuse, and remanufacture services to grow their own business too. In the short and medium terms, profits can be generated primarily through better utilisation of products (repair and reuse). In the long term, the establishment of product service systems becomes of crucial strategic importance. A household appliance manufacturer that no longer just sells products to its customers, but also makes them available for a rental fee, extends its value chain beyond production.[18]

End-of-life management services for consumer goods can also create significant jobs. It has been estimated that the recycling of **10,000** tonnes of plastic waste employs roughly 23 workers full-time in the collection, 17 workers in sorting and pre-treatment, and 30 workers in recycling[19] (Deloitte, 2015). Transport, energy recovery, and landfill activity for an equivalent amount of plastic waste only employ one person. In that sense, the EU has envisaged that, by 2030, its plastics sorting and recycling capacity will increase fourfold compared to 2015. This could create 200,000 new jobs across Europe.[20] Last year alone, the amount of recyclable materials recovered by SENS eRecycling could build 4 Eiffel Towers, produce 3.5 million trumpets, and produce 200,000 million bicycles. These materials, so-called secondary materials, are then processed into new products, consuming significantly fewer primary raw materials in the circular than in the linear economy.[21] This

[14] http://www3.weforum.org/docs/WEF_Shaping_the_Future_of_Construction_full_report__.pdf
[15] https://ams-forschungsnetzwerk.at/downloadpub/2022_wifo_kreislaufwirtschaft_fti_69445.pdf
[16] https://www.greenbiz.com/article/circular-mining-reaches-mainstream
[17] At the regional, national, and sectorial levels, strategies and action plans for managing supply risks for critical materials based on circular economy principles are in stark development. For example, the Critical Raw Materials (CRM) list of the European Commission and the European Raw Materials Alliance (ERMA) foster efficient use and recycling of critical raw materials.
[18] https://z-punkt.de/de/themen/circular-economy-now
[19] https://www.plasticsrecyclers.eu/wp-content/uploads/2022/10/increased-eu-plastics-recycling-targets.pdf
[20] https://www.eea.europa.eu/policy-documents/com-2018-28-final-a
[21] https://www.erecycling.ch/wissenswertes/wissensblog/fach-83.html

saves precious resources, including a lot of energy, compared to the extraction of new raw materials.

2. Developing Circular Economy Strategies for Countries, Cities, and Sectors

Governments and local decision-makers are developing circular economy action plans to holistically tackle sustainability goals such as climate change and the SDGs, and to address resource constraints. Cities too, have developed visions inspired by circular economy principles with similar motives (i.e., to increase economic productivity through reduced waste and costs, reduce pollution in residential areas, and to reduce reliance on raw materials by keeping products in use and balancing local production with global supply chains).[22]

Countries in the European Unions (EU)

Almost all European Union member states have adopted or are currently drafting circular economy strategies.[23] To draft effective strategies, most EU member states have provided funds for research programmes and innovation hubs to support the testing, development, and upscaling of circular solutions.

In ensure an evidence-based policy development process many EU member states have used material flow analysis that assesses the type and extent of material losses nationally and regionally (see figure 2). In addition, several EU member states have set up a monitoring system to track progress on the circular economy actions. For example, the German circular economy vision monitors this target with the indicator-based target on total material productivity. The goal for this indicator is to continue the trend of the years 2000-2010, an annual increase of 1.5 % on average, until the year 2030[24].

[22]https://archive.ellenmacarthurfoundation.org/explore/cities-and-the-circular-economy#:~:text=The%20implementation%20of%20a%20circular%20economy%20vision%20could,and%20balancing%20local%20production%20with%20global%20supply%20chains

[23] https://www.eionet.europa.eu/etcs/etc-ce/products/draft-report-for-dg-env_final.pdf

[24] https://www.circular-economy-initiative.de/circular-economy-roadmap-fr-deutschland

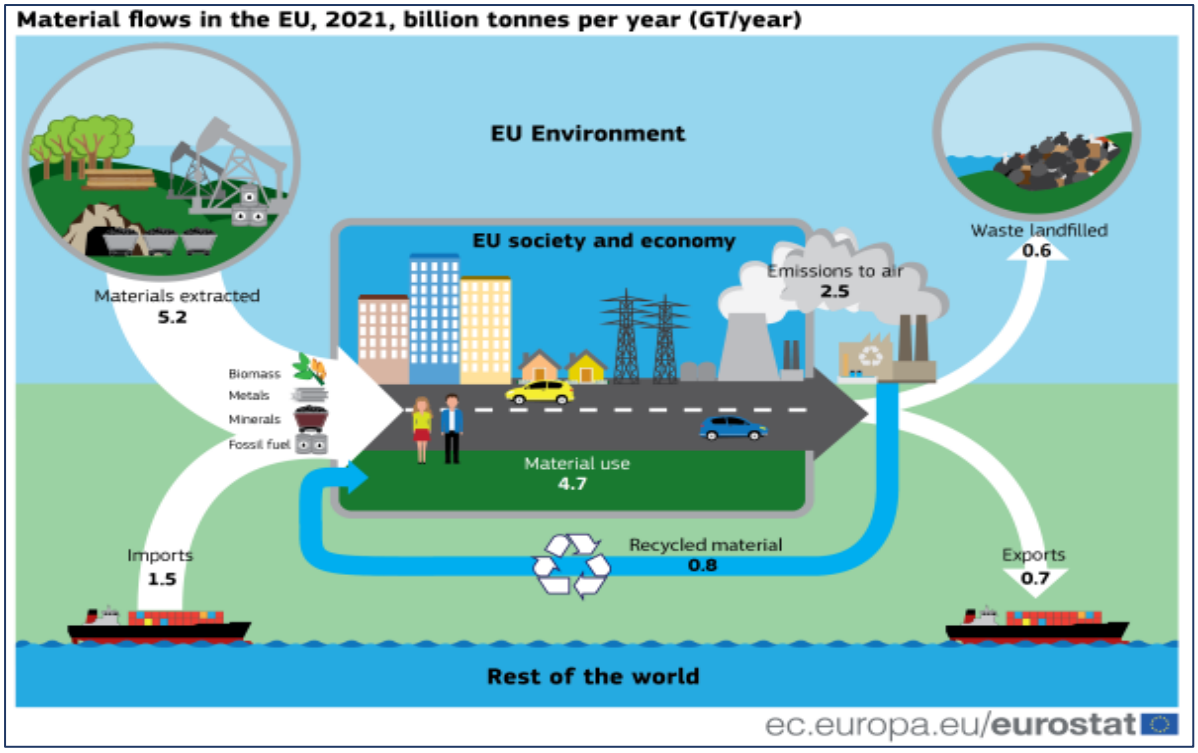

Figure 2: Material flows in the EU in 2021 according to the Eurostat statistics.

The Circular Economy Initiative Germany 2030: Vision for the transformation to a Circular Economy[25]

In the early years, **Germany's approach to waste management was focused on controlling the disposal of waste and minimizing its negative impact on the environment.** This was achieved through the introduction of laws and regulations governing the handling of hazardous waste and the management of landfills.

In the 1990s, Germany began to shift its focus towards resource efficiency. This approach recognizes that resources are finite and should be used efficiently to reduce waste and conserve natural resources. This led to the development of policies that encouraged the recycling and reuse of materials, such as the introduction of mandatory recycling schemes for household waste and the establishment of extended producer responsibility schemes.

The German Resource Efficiency Programme (ProgRess)[26] was launched in 2012 to further promote resource efficiency in the country. ProgRess aims to guide and coordinate policy measures and promote a more sustainable use of resources in

[25]https://www.eionet.europa.eu/etcs/etc-ce/products/etc-ce-products/etc-ce-report-5-2022-country-profiles-on-circular-economy/germany-ce-country-profile-2022_for-publication.pdf
[26]https://www.bmuv.de/en/topics/water-resources-waste/resource-efficiency/german-resource-efficiency-programme-progress-an-overview

Germany. It focuses on five thematic areas: 1) Consumption, 2) Production, 3) Infrastructure, 4) Biological Diversity, and 5) International Cooperation.

ProgRess has been updated twice, with the most recent version, ProgRess III, published in 2021. ProgRess III sets out a series of ambitious goals for Germany to achieve by 2030, including reducing primary raw material consumption and increasing resource productivity.

More recently, Germany has embraced the circular economy concept, which seeks to eliminate waste and create a closed-loop system where resources are reused and recycled indefinitely. This approach involves designing products and processes with the aim of creating a circular flow of resources, where waste is minimized, and materials are kept in use for as long as possible.

To implement this circular economy approach, Germany has introduced a range of policies and initiatives, including the development of circular economy hubs, the creation of a Circular Economy Act in 2020, and the promotion of circular procurement practices.

Overall, Germany's approach to waste management has evolved over time, reflecting a growing recognition of the need to use resources more efficiently and move towards a circular economy model. The ProgRess program has played a key role in guiding and coordinating policy measures towards this goal.

Spain's Circular Economy Initiative

In **Spain**, the 'España Circular 2030' outlines a strategy to reduce the national consumption of resources by 30% while reducing the generation of waste by 15% between 2020 and 2030.[27] Key sectors are construction; farming, fishing, and forestry; industry; consumers goods; tourism and the textile and garment sector.[28]

Spain started implementing extended producer responsibility (EPR) schemes in 1996 (see Annex 1 for global EPR adoption). Various organisations are managing the collection, treatment, and disposal of various products such as glass, plastics using EPR fees collected from manufacturers and importers.

An innovative tool further promoting circular economy business models is the Circular Lab, which aims to promote sustainability in packaging design and efficiency improvements in collection, sorting, and recycling.

Countries in West Asia

The integration of the circular economy concept and its principles in strategies and action plans are still in the early stages in West Asia, with only a few countries such as Türkiye or the United Arab Emirates already embarking on their journey.

The motives behind countries in this region adopting circular economy practices vary. Some of them seek to keep pace with the requirements of the European Union's circular economy action plan, others aim to manage risks for export-oriented sectors, and others and financing more effective solutions for reaching net zero carbon goals.

[27]https://circulareconomy.europa.eu/platform/sites/default/files/espana_circular_2030_executive_summary_en.pdf
[28]https://www.miteco.gob.es/es/calidad-y-evaluacion-ambiental/temas/economia-circular/estrategia/#:~:text=La%20Estrategia%20Espa%C3%B1ola%20de%20Econom%C3%ADa%20Circular%20%28EEEC%29%20insta,de%20un%20modelo%20sostenible%20econ%C3%B3mico%2C%20social%20y%20ambiental

Türkiye Circular Economy Action Plan (CEAP)

In line with the recommendations of Türkiye's 2021 Green Deal Action Plan, and with financial support from the EU, **Türkiye** recently started working on a comprehensive national strategy for the overall implementation of the EU's new circular economy action plan (CEAP)[29].

While the initial focus was on improving the waste management system, the strategy development led to the identification of many resource efficiency opportunities in priority and export-oriented sectors such as plastics, textiles, food and biomass, electronics, and IT, among others. The process also led to many knowledge sharing sessions and focus group meetings. More two hundred private, public, academic, and non-governmental organisations were either visited or surveyed.

Currently, an analysis of the extent of circularity in Türkiye is being conducted. Next steps are the development of monitoring mechanisms and the indicators for the sectors with high circularity potential and pilot projects for showcasing implementation.

The United Arab Emirates' Circular Economy Initiatives

In recent years, the **UAE** launched several initiatives and programmes to promote circular economy practices across various sectors. [30] The Emirati Circular Economy Policy (2021) is a national framework that identifies the optimal approach to the transition to a circular economy, involving the use of modern technologies, as well as the adoption of sustainable consumption and production patterns. It was produced and developed jointly by the public sector, the private sector, and various international entities, and will be implemented through a roadmap consisting of three phases.

The priority areas include infrastructure, transportation, construction, manufacturing, food processing and consumption. As an example, the construction industry is one of the largest generators of waste and greenhouse gas emissions globally, and the UAE has set ambitious targets to reduce waste in this sector. Dubai Municipality launched the Dubai Circular Economy Policy, which aims to divert 75% of construction and demolition waste from landfills by 2021.

The UAE has also launched several initiatives to promote circular economy practices in the food and agriculture sector, for instance, to convert organic waste into

[29] https://dongusel.csb.gov.tr/en

[30] https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/policies/economy/uae-circular-economy-policy

compost, which can be used as a fertilizer. Another initiative encourages farmers to minimize food waste throughout the production process.

Governments in the wider region are working towards circularity as well. A well-observed trend is the shift from a waste management-oriented environmental policy to a resource management perspective. National and local governments are working in donor-funded projects on regulatory, voluntary, and information policy instruments to separate, collect and, where possible, recycle materials and prevent their release into the environment.

In Morocco, for instance, an Extended Producer Responsibility (EPR) roadmap for PET plastic bottles (including other packaging waste) is being developed. In addition, an implementation decree including a registry of producers and contractual models for stakeholders will be established in the next months.[31]

On the other hand, in Algeria, a voluntary EPR system by which producers would financially contribute to the collection of packaging waste and improvement of the income of collectors is going to be tested in a Willaya.

In Jordan, the EPR law for packaging waste was officially published in August 2022, which will be voluntary for all producers and importers during the year 2023 and will become mandatory starting in the year 2024 for all producers and importers with an annual turnover of 50 million Jordanian dinars or more.

Finally, while many West Asia countries including Jordan[32] developed and ratified Sustainable Consumption and Production National Action Plans, the concept of circular economy - keeping materials at highest value, utilising regenerative practices, and ultimately avoiding waste - has not been mainstreamed on all policy fronts. Efforts like the Regional Policy Hub[33] are working to bring like-minded policymakers together and suggest solutions to common challenges.

[31]https://www.medwaves-centre.org/new/medwaves-strengthens-support-to-the-southern-med-in-the-second-phase-of-marine-litter-med-project/

[32] This action plan translates into strategic and operational objectives for: Agriculture/Food Production, Transport, and Waste Management: https://switchmed.eu/wp-content/uploads/2020/04/01.-SCP-NAP-Jordan.pdf

[33] https://www.theswitchers.org/policy

3. Opportunities of the Circular Economy in Jordan

Promising Circular Economy Sectors in Jordan

There are several references to the concept of circular economy in the Jordan Economic Modernization Vision[34], whose aims are to promote economic growth and create new job opportunities, while also ensuring the preservation of natural resources and the environment. For example, as part of the sustainability pillar, the objectives of waste generation reduction and waste recycling mentioned. As part of the High Value Industries Driver," preparing standards for circular economy practices in industrial activities and focusing on environmental industrial parks" was also highlighted.

While these strategies are promising, going further beyond waste management and resource efficiency perspective into full integration of all circular economy principles can provide Jordan with further socio-economic and environmental benefits.

Jordan's manufacturing industry is the country's largest sector and is expected to double in size by 2033 and add around 260 thousand new jobs to the country with chemical products, textiles, food, pharmaceuticals, and engineered products as the main product lines. These sectors consume significant amounts of energy and resources, making them **prime candidates for implementation of circular approaches aimed at increasing efficiency, reducing waste, and promoting overall sustainable practices.**

Jordan's private sector plays a vital role in driving the country's economy, accounting for a significant portion of employment as well as export revenues. The private sector is diverse, ranging from small and medium-sized enterprises (SMEs) to large multinational corporations, with industries spanning from textiles to food processing. **The circular economy presents numerous opportunities for the private sector to drive innovation, increase resource efficiency, and reduce environmental impact while creating economic benefits.**

The **textile industry** is one of Jordan's largest export sectors with a total of 27 % of the Kingdom's manufacturing exports, and is projected to grow 12% per year[35]. The sector could, among other aspects, benefit from incorporating more recycled and circular fabrics in its production processes. This in turn, could create cooperation opportunities with large international brands who want to meet their sustainability goals by increasing the use of recycled content in their garments. Currently, the disposal of textile waste poses a significant environmental burden. Recovering textile waste or leftover materials,

[34] https://www.jordanvision.jo/img/vision-en.pdf
[35] Manufacturing Sector vision 2033 and strategic roadmap 2022 - 2033. Manufacturing (fliphtml5.com)

meanwhile, will reduce waste, unlock new economic opportunities and business segments, as well as create industrial symbiosis. For example, textile and RMG producing companies can implement textile waste reselling programs to other factories or divert leftover textiles from being landfilled for upcycling purposes or invest into textile waste recycling technologies (read more on the case of the Ready-Made Garment (RMG) sector in Annex).

Jordan's **food-processing industry** is one of the largest employers, but manufacturers face high electricity prices and limited availability of locally sourced raw materials. Producers and consumers can benefit at large from implementing circular procurement practices as this would create a demand for locally sourced and produced food. As a result, a circular economy would create opportunities for new businesses around domestic food production and increase local employment opportunities and promote sustainable agricultural practices.

Service-based models such as product as a service and sharing economy can help reduce the consumption of resources. For example, the sharing of cars, bikes, and other transportation options can help reduce the need for private vehicle ownership and associated resource consumption. Similarly, product-as-a-service models can help extend the lifetime of products and reduce waste by encouraging repair, refurbishment, and remanufacturing.

Table 1 outlines these challenges and opportunities in more detail.

Table 1. Circular Economy challenges and opportunities for the private sector

CHALLENGES	OPPORTUNITIES
Fashion and textiles	
Current system for producing clothes operates mainly on the linear take-make-dispose model. The EU Strategy for sustainable and circular textile set design requirements for textiles to make them last longer, easier to repair and recycle.[36]	Opportunity to produce higher value garments and as a result increase the value of export products. Collection, separation, and recycling industries can be established as the international demand for recycled fibre is increasing due to set circularity targets by big brands.
The fast fashion industry is putting pressure on the waste management systems by creating low- quality low- value garments	Opportunity to produce higher value garments and as a result increase the value of export products.

[36] https://environment.ec.europa.eu/strategy/textiles-strategy_en

which are not designed for long use and thus are disposed quickly and contributing to the increasing amount of post-consumer textile waste.	
Rising costs of competitive raw materials which are used in the production of textile products.	By creating an industry around recycling different types of textiles (used textiles or post-industrial textile waste), it is possible to convert the textile waste into materials (fibre, yarn, fabrics) which can be used in the production of textiles locally or taken to export markets.
The production of textile products is resource-intensive and requires large amounts of water and energy.	Increased resource efficiency in production as well as increasing the use of renewable electricity can significantly reduce the emissions and environmental burden of the textile production sector.
Food	
High production cost (mainly due to high electricity prices), lack of specialized talent, and limited availability of raw materials in the domestic market.	Implementing sustainable/circular public procurement practices can create a market for locally produced food, which in effect can create domestic green jobs along the value chain.
Food waste and biowaste are a burden for local landfills.	Bio-waste can be used for composting and creating fertilizers that could be used for domestic agriculture. Bio-waste can be used for creating alternative energy sources such as biodiesel or -gas. Leftovers from food processing industries can be used for developing new products and fostering innovation in the food sector.

Manufacturing	
Small size of the domestic market limits the growth of the industry and high production costs (mainly due to high energy prices).	Implementing of sustainable/circular (public) procurement can increase the demand for domestic products produced based on the sustainable/circular procurement guidelines. Increasing the use of renewable resources for electricity production reduces the GHG emissions from manufacturing as well as can reduce the energy production cost in the long term.
Utilisation of waste	Potential for creating industrial ecology/industrial symbiosis, for example using fuel made from bio-wase (i.e., biogas) as energy-input for manufacturing as well as using the waste of one company as input for another.
Consumer goods - Electronics	
Utilisation of Electrical and electronic equipment (EEE) products - improper processing of e-waste can have severe health effects to people who handle the waste as well as increase the environmental burden due to toxic chemical being potentially released into the environment.	Foster an economy where electronics stay longer in use by incentivization of the repair and refurbishment businesses. Implementation and encouragement of the renting, leasing models. Create collection and recycling facilities for domestic e-waste have large opportunity for creating green jobs along the value chain.
Proper disposal of e-waste requires training and investment in recycling and management technology.	The recycled materials can be new feedstock when producing new products and unlock new economic opportunities and businesses.
Consumer goods - Packaging	
The demand for packaging, especially plastic packaging, is growing globally, contributing to the increase in landfill and creating an environmental burden as plastic waste takes a long time to decompose.	Exploring alternative packaging materials, such as bioplastics or plant-based materials as an alternative to current conventional solutions has the potential for fostering innovation and

The new EU circular economy action plan asks for "all packaging on the EU market to be reusable or recyclable in an economically viable way by 2030". In addition, by 2030 for contact-sensitive packaging, min 25% recycled content target is set.	creating new businesses and job opportunities. Increasing the use of recycled plastics in packaging production could reduce the amount of plastics ending up in landfills since the materials are kept in the loop for a longer time. Unlocking new export markets as the demand for recycled and recyclable plastics is increasing.
Construction & Built Environment	
Urbanization drives the demand for new housing and more infrastructure.	Use of alternatives (such as waste materials like plastic and textiles) and sustainable materials when constructing houses or building infrastructure.

Recommended Frameworks for a Circular Economy in Jordan

1. Sustainable Manufacturing Practices.

Jordan can integrate eco-design principles into its industrial policies by promoting the adoption of sustainable manufacturing practices. This can be achieved through the provision of incentives, such as tax breaks and subsidies, to companies that adopt sustainable manufacturing practices. The government can also establish regulatory frameworks to promote sustainable manufacturing practices, such as mandatory eco-design requirements for certain products.

2. Extend the Use of Products.

Jordan can integrate the promotion of reuse, repair, and refurbishment into its existing environmental policies. The idea of keeping materials in use for as long as possible is a key principle of circular economy. For example, the government can establish regulations that require companies to offer repair services for their products and promote the development of local repair and refurbishment industries. The government can also provide incentives to companies that adopt reuse and refurbishment practices, such as reduced taxes or preferential access to government contracts.

Jordan can further improve its recycling policies and infrastructure. The Kingdom has already established several policies and initiatives to promote recycling, including the development of a national waste management strategy. The government can promote the development of a circular economy by investing in recycling infrastructure and promoting the development of local recycling industries. This can be achieved through the provision of financial incentives to companies that invest in recycling infrastructure, as well as the establishment of regulatory frameworks to promote the recycling of certain materials.

3. The Sharing Economy.

Jordan can introduce sharing economy by promoting the development of sharing platforms and services, such as car-sharing or bike-sharing schemes. This can help reduce the need for individual ownership of assets and promote the efficient use of resources. For example, the government can provide financial incentives to companies that establish sharing platforms or promote the development of local sharing economies through the provision of grants and other support.

4. Resource Use Efficiency

Jordan can implement resource efficiency measures such as energy-saving technologies, renewable energy adoption, and energy-efficiency in high-consuming sectors such as industry, transport, buildings, and agriculture to help reduce energy consumption and costs. The way energy is produced and consumed has a significant impact on resource efficiency and waste reduction. By adopting renewable energy sources such as solar and wind, it is possible to reduce the dependence on finite fossil fuels and reduce greenhouse gas emissions that contribute to climate change.

Jordan's industrial sector is the main consumer of energy, with energy-intensive industries being the main culprits. The Kingdom has already made strides with renewable energy production, with 26% of the country's electricity being renewable, and increasing the share of renewables even more, which can help shift the manufacturing industry to support the reduction of GHG emissions and move towards carbon neutrality.

As of now, there are limitations in the industry regarding making investments into additional renewable electricity production capacities. To increase the share of renewables in the countries energy mix and support carbon neutral industry even further, Jordan would benefit from improving its renewable energy policies.

In conclusion, the integration of circular economy principles and strategies into the Jordan Economic Modernization vision and existing environmental and industrial policies can help Jordan achieve its economic and environmental goals. By promoting sustainable manufacturing practices, reuse and refurbishment, recycling, and the sharing economy,

Jordan can reduce waste and pollution, promote the efficient use of resources, and create new economic opportunities. The government can play a key role in promoting the adoption of circular economy principles and strategies through the provision of incentives and regulatory frameworks, as well as investment in recycling infrastructure and sharing platforms.

4. The Way Forward to Unlock the Circular Economy's Opportunities in Jordan

1. Create Awareness

As a first step, it is important to raise awareness of the circular economy opportunities available to Jordanian businesses and organizations. For this, studies using the most recent circular economy assessment tools such as material flow analysis, circularity transition indicators[37], resource productivity, and circularity potential at the company, sectorial, city and national level can be quantified. As a follow-up, business cases can be developed on innovative interventions and business solutions that can be implemented.

In the creation of awareness, business support organizations can play a leading role to facilitate forums to inform stakeholders, including businesses, policymakers, and the public, on the potential of a circular economy in Jordan with quantified evidence and how the implement circular practices. For example, the Association of German Engineers regularly organize thematic roundtables issuing white papers for informing their members on the risks and opportunities from policy and product development perspectives[38].

2. Enable Access to Finance

Among the enabling factors for the circular economy, access to finance requires a great deal of attention. This can include funding for the development of innovative products using alternative materials, technology transfer to close material loops and increase resource efficiency, and most importantly, the implementation of circular business plans. In this sense, the whole range of financial products, from grants to impact funds to loans, needs to be used. Furthermore, as circular economy practices require unusual cross-sector partnerships (e.g., between farmers and energy service providers, textile manufacturers, and furniture companies), financial instruments will need to adapt to these needs.

3. Working Together

[37] https://www.wbcsd.org/Programs/Circular-Economy/Metrics-Measurement/Circular-transition-indicators
[38] https://www.vdi.de/themen/politischer-dialog/dialog-events/vdi-round-table-circular-economy

The private sector will have to take the lead in exploiting the opportunities of the circular economy. An enabling policy framework is key to the transition from linear to circular practices. Initial investments in resource-efficient practices, developing new services to keep their product offerings in use longer, taking back their products to sort and recycle the materials back into the economy, and switching to bio-based materials to replace fossil fuel-based materials can be costly.

To encourage companies to set and work towards long-term circularity goals, policy must create a level playing field. This means that public policy instruments need to support companies in de-risking their investments in the circular economy. Jordan's Economic Modernization Vision and the recently launched National Exports Strategy constitute a great base for developing a complementary Circular Economy Roadmap in priority sectors.

A stakeholder-oriented roadmap development process can provide the base for the identification of regulatory requirements and economic incentives. In view of the sometimes divergent interests, expectations, and conflicting goals of the various stakeholders, policymakers from Ministry of Environment, Ministry of Industry Trade and Supply, Ministry of Investment, Ministry of Local Administration, Ministry of Planning and International Cooperation might be called upon to create a holistic framework that supports and accelerates this transformation through a combination of regulatory, financial, informational and voluntary instruments in the main sectors.

Annexes

Annex 1 Extended Producer Responsibility Efforts Around the World

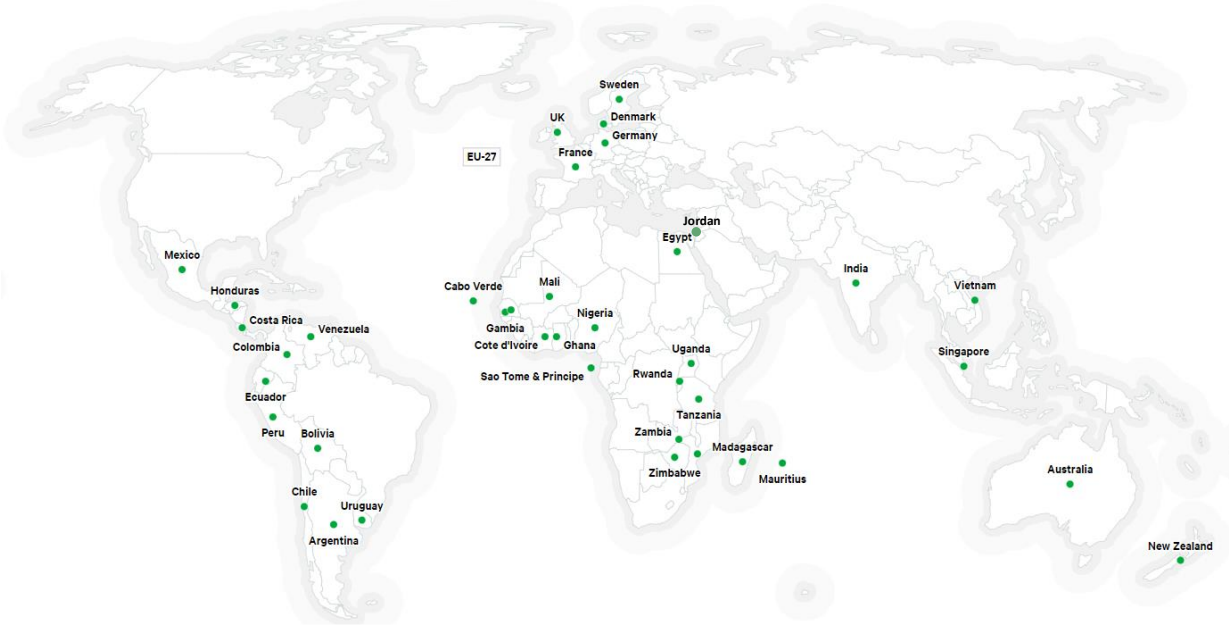

Figure 3: Countries with extended producer responsibility schemes. (Source: https://circulareconomy.earth/)

Annex 2 Circular Economy Opportunities in the Jordanian Ready-Made Garment (RMG) Sector

The Jordan's RMG (Ready-Made Garment) sector is a major contributor to the country's economy. The sector employs over 75,000 people and[39] accounts for around a quarter of the country's total exports[40]. The sector has been growing steadily since 2008 and is expected to continue growing in the coming years, driven by increased demand from key export markets such as the North American countries[41].

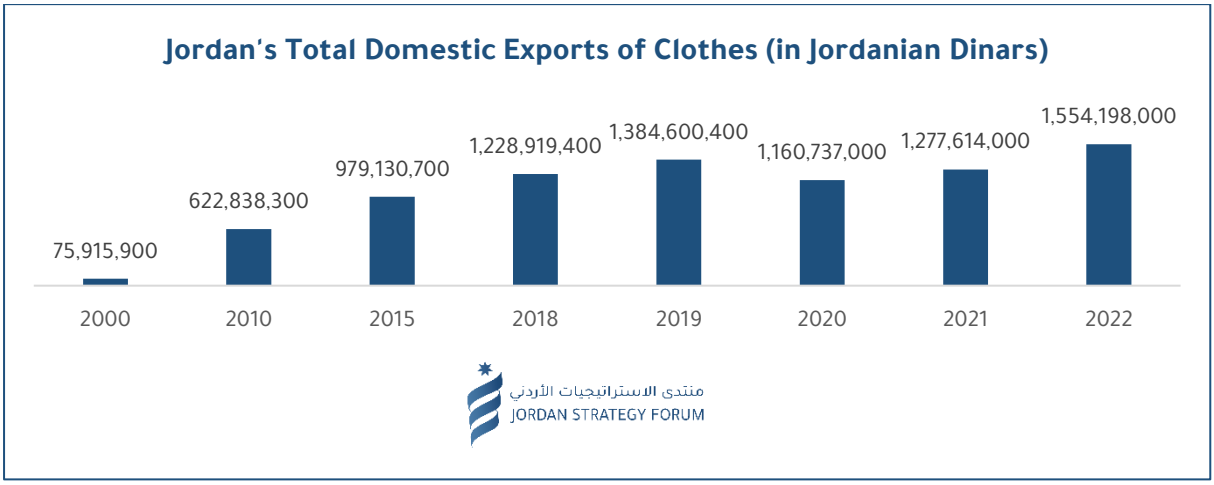

Figure 4: Jordan's Total Domestic Exports of clothes[42]

The sector still faces some challenges, such as rising production costs, intense competition from other countries, and the need for continued investment in technology and innovation to keep up with changing consumer demands.

Figure 5: Landfilled post-industrial waste

The Jordanian RMG sector also faces significant environmental challenges, including high energy consumption, water scarcity, and the generation of large amounts of textile waste.[43] Additionally, the sector is highly dependent on energy from fossil fuels, leading to greenhouse gas emissions and contributing to climate change. The production of textile and garments in Jordan's industrial zones results

[39] https://www.ilo.org/global/topics/fair-recruitment/publications/WCMS_858644/lang--en/index.htm
[40] https://www.worldstopexports.com/jordans-top-10-exports/#google_vignette
[41] Jordanian Strategy Forum. The Textiles Sector in Jordan: How Can Jordan Maximize the Benefits from, and Increase Employment in the Sector?
[42] https://www.cbj.gov.jo/
[43] Environmental Sustainability in the Jordanian Garment Sector

in considerable amounts of solid textile waste. This waste consist of mainly garments that do not meet the customers' quality standards as well as excess garment products that were not accepted or sold. The generation of textile waste is also a significant environmental issue, with much of it being disposed of in municipal landfills, leading to pollution and contributing to greenhouse gas emissions.[44]

Despite these challenges, there are several opportunities for the RMG sector in Jordan. The study conducted in Al-Hassan Industrial Estate HIE shows that the waste produced by the textile industry can be utilized as raw materials to create circular business models that recycle, reuse, and upcycle materials. Five business cases were identified in the study which could be with successful implementation boost local circular textile economy. [45]

1. **Investing in material-efficient technology and software**, such as CAD cutting optimization technology and seamless kitting technology, can reduce textile waste generated in the cutting phase, increase raw material utilization, minimize fabric consumption, and reduce waste disposal costs.
2. **The mechanical recycling of waste** in the RMG factories in Jordan also has the potential to create economic value by selling waste to other sectors. However, creating Industrial Symbiosis around mechanical recycling of textile waste requires large investments into technology and infrastructure. These barriers need to be addressed along with fostering regulatory frameworks which support circular-economy-driven product innovations.
3. **Mechanical recycling fibre-to-fibre Yarn production** involves creating a value chain for high-quality regenerated fibre and yarn by collecting, sorting, and processing textile waste. The recycled yarn can be used in various manufacturing processes, resulting in cost savings for manufacturers. However, successful implementation requires effective collection and sorting processes, low elastane content in the waste, and research and development. With sufficient capital investment, the production of regenerated fibre and yarn can have a payback period of less than a year.
4. **Chemical recycling for Fibre-to-Fibre Yarn production** proposes the creation of a joint recycling hub that uses chemical recycling to convert textile waste into yarn for knitting factories. This business case would require significant initial investments and poses some potential environmental risks related to energy, water, and wastewater treatment. Yet, it could offer a partial solution to the textile waste challenge in the Jordan industrial zones.

[44] GIZ GAIN. Pilot 1 Report: Collecting and Sorting of textile waste at the HIE in Jordan (unpublished)
[45] Circularity in the Jordanian RMG Sector. Study on garment waste materials reduction and their revalorisation potential.

5. **Upcycling with social entrepreneurs** proposes the establishment of social enterprises focused on upcycling textile waste, which can create jobs and contribute to the local economy while also reducing the environmental impact of the RMG industry. There are already programs (The Queen Rania Centre for Entrepreneurship) set up to support young Jordanians in setting up circular economy businesses focused on textile waste.

The EU's new strategy for sustainable and circular textiles[46] presents a significant opportunity for Jordanian RMG sector to capitalize on the growing demand for closed-loop recycling of textile products. By 2030, all textile products placed on the EU market must be to a great extent made of recycled fibers. The resulting surge in demand for recycled fibers is expected to be met in part by European recycling industries, but there is a significant supply gap[47], which creates an opportunity for Jordanian RMG sector to step in and provide recycled fibers and yarns. The Jordanian RMG sector can position itself as a key player in the growing global market for closed-loop textile recycling.

Establishing a circular RMG sector in Jordan, achieved by promoting and establishing textile upcycling startups, can deliver notable socio-economic advantages to the country. Through the reduction of textile waste that is currently sent to landfills, this sector can create opportunities for investment in local entrepreneurs and job creation throughout the value chain. As a result, the circular RMG sector can stimulate economic growth and skills development, leading to a positive impact on the local economy.

In summary, the creation of a circular RMG sector in Jordan has the potential to generate significant socio-economic benefits by fostering entrepreneurship, creating jobs, and promoting economic development.

[46] https://environment.ec.europa.eu/strategy/textiles-strategy_en#:~:text=The%20EU%20strategy%20for%20sustainable%20and%20circular%20textiles,circular%20economy%20action%20plan%20and%20the%20industrial%20strategy.

[47] https://www.mckinsey.com/industries/retail/our-insights/scaling-textile-recycling-in-europe-turning-waste-into-value

Linear Economy Versus Circular Economy

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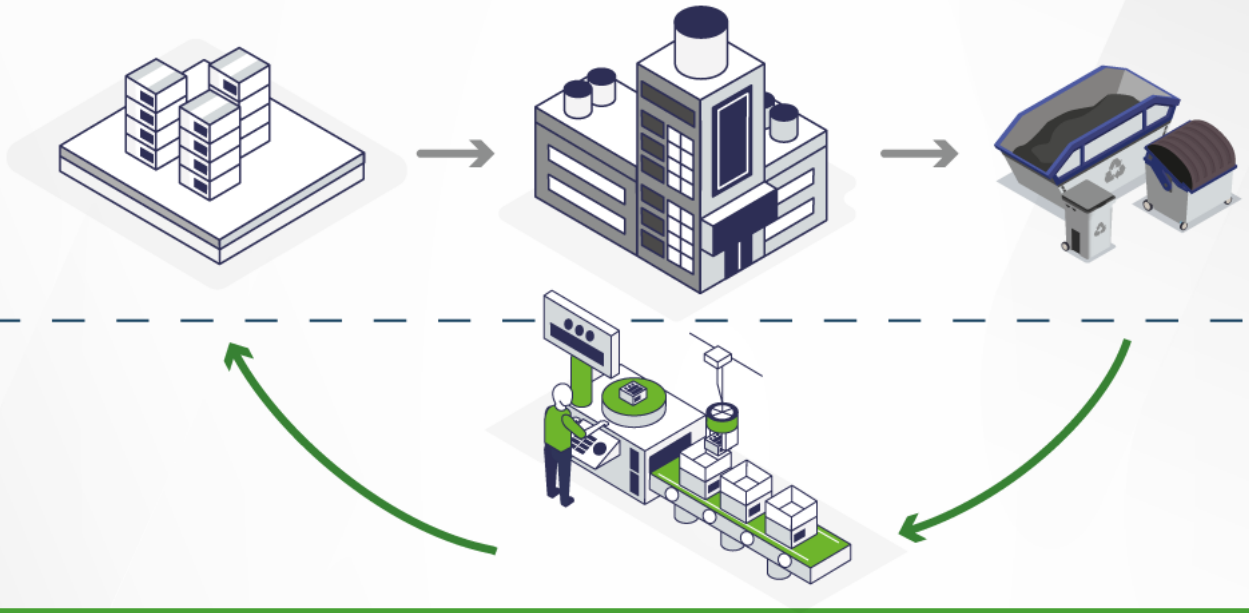
Linear Economy: A Linear Economy follows the **take-make-dispose** system which has resulted in the generation of enormous amounts of waste and emissions and has increased pressure on social and ecological systems.

50%
of the global greenhouse gas emissions.

90%
of the biodiversity loss and water stress.



Circular Economy: The Circular Economy is based on the principle of the natural cycle of matter which means; Waste becomes a resource for other organisms because of biochemical decomposition processes or **the waste is converted into other, harmless, reusable resources.**

Circular Economy Core Principles:

- Eliminate waste and pollution through reduced resource use.
- Circulate products and materials (at their highest value).
- Regenerate nature.

Circular Economy is able to

- **28%** Reduce resource extraction
- **39%** Reduce global carbon emissions
- **6 Million** Create new jobs globally

138 Billion Dollars

If the GCC countries adopt the principles of the circular economy, they can save around 138 billion dollars by 2030.

Date: June 2023

Source: Report published by the Ellen Macarthur Foundation titled "The Nature Imperative: How the circular economy tackles biodiversity loss" and Policy paper published by the Jordan Strategy Forum titled "Circularity: Jordan's Opportunity to Promote Economic Growth"

Opportunities to Apply the Peinciples of Cirular Economy in Various Sectors

منتدى الاستراتيجيات الأردني
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Fashion and Textiles

- Create systems for the collection, separation, and recycling of used clothes.
- Convert textile waste into materials that can be used in the production of textiles locally or taken to export markets.
- Increase resource efficiency in production.
- Significantly reduce the emissions and environmental burden of the textile production sector.

Food

- Create domestic green jobs along the value chain by creating a market for locally produced food and ensuring sustainable practices in factories.
- Use leftovers from food processing industries for developing new products which will foster innovation in the food sector.
- Use bio-waste for composting and creating fertilizers that could be used for domestic agriculture.
- Use bio-waste for creating alternative energy sources such as biodiesel or biogas.

Manufacturing

- Implement sustainable procurement practices which can increase the demand for domestic products.
- Increase the use of renewable resources for electricity production to reduce emissions from manufacturing and reduce the energy production cost in the long term.
- Create industrial ecology/industrial symbiosis by using the waste of one company as input for another.

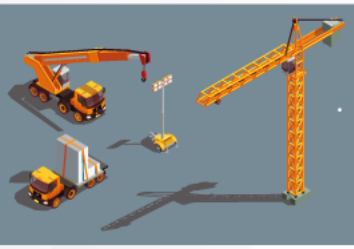
Consumer Goods Electronics

- Foster an economy where electronics stay longer in use by incentivization of the repair and refurbishment businesses.
- Create collection and recycling facilities for domestic e-waste and create green jobs along the value chain.
- Use recycled materials as feedstock when producing new products which will unlock new economic opportunities and businesses.

Consumer Goods Packaging

- Boost innovation and create new businesses and job opportunities.
- Reduce the number of plastics ending up in landfills.
- Unlock new export markets as the demand for recycled and recyclable plastics is increasing.

Construction:



- The use of alternative and sustainable materials (such as plastic and textile waste) in building materials for homes and infrastructure.

Date: June 2023
Source: Policy paper published by the Jordan Strategy Forum titled "Circularity: Jordan's Opportunity to Promote Economic Growth"

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