



GOVERNMENT OF
UNITED ARAB EMIRATES

UAE Circular Economy Policy

2021 - 2031



In partnership with

MINISTRY OF CABINET AFFAIRS

**MINISTRY OF CLIMATE CHANGE
& ENVIRONMENT**

MINISTRY OF ECONOMY

**MINISTER OF STATE FOR
ARTIFICIAL INTELLIGENCE OFFICE**

Acknowledgement

International organization

Global Green Growth Institute
World Economic Forum
Emirates Nature - WWF

Private sector

Alpha emirates
Averda
Borouge
CIRCLE Coalition
DNATA
DP world – Dubai
Dulsco
Elite Agro
Emirates
Emirates flight catering
Emirates green building council
Enviroserve
Fly dubai
Frost & Sullivan
Galadari Motor Driving Centre
Geocycle
Green Ethics FZ LLC
IBK consultant
KBS communication
Majid Al Futtaim Holding LLC
Metro taxi
Multinational Companies Business Group (MCBG)
Nueral Fuel
Procter & Gamble
SUEZ
UAE Food & Beverage Manufacturers Group
United Parcel Services (UPS)
Veolia
Alliances for Global Sustainability

Government sector

Ministry of Finance
Ministry of Energy & Infrastructure
Ministry of Industry & advanced technology
Food & Water Security Office

Local sector

Environment Agency – Abu Dhabi (EAD)
Abu Dhabi Agriculture and Food Safety Authority (ADAFSA)
Tadweer the Center of Waste Management
Department of Municipalities and transport – Abu Dhabi
Dubai Municipality
Dubai Supreme council of Energy
Road & transport authority – Dubai
Dubai airports
Sharjah City Municipality
Bee'ah
Ajman Municipality & Planning department
Umm Al Quwain Municipality
Ras Al Khaimah Municipality
Environment Protection & Development Authority- RAK
Al Fujairah Municipality

Academia

Hamdan Bin Mohammed Smart University
University of Sharjah

Introduction

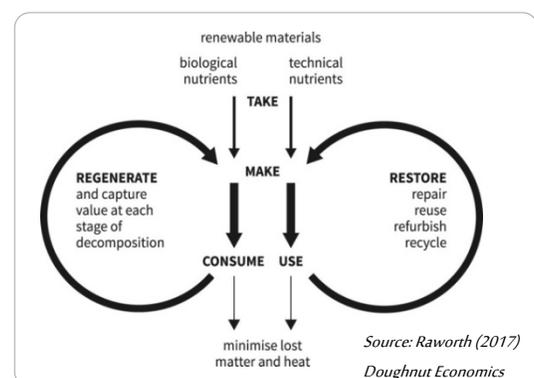
The rapid growth in the economy and population of the UAE has brought considerable prosperity, but also dramatic increases in the demand for resources such as energy, food and water. The way in which we consume and produce goods and services can have a significant adverse impact on our environment. Over the last century, global patterns of consumption and production have been accompanied by environmental degradation that threatens the very systems we rely on to survive. It does not have to be this way. We can “do more and better with less”, breaking the traditional linkages between economic growth and environmental degradation. This need to break the linkage is explicitly recognised in the UN’s twelfth Sustainable Development Goal (SDG12) which calls for countries “to ensure Sustainable Consumption and Production (SCP).”

In this context, the circular economy approach seeks to advance comprehensive development, affecting its three dimensions, by working on changing environmental and financial practices, forming different global economies, in addition to applying sustainable production and consumption practices. One of the most important factors in the transition to a circular economy is that it lies in the use of successful economic tools and encourages investment in natural resources.

The UAE government is committed to achieving more Sustainable Consumption and Production (SCP) and meeting SDG 12 by moving away from a degenerative linear (take, make, use, dispose) economy where minerals, metals, biomass and fossil fuels are extracted from the earth, manufactured into products, used or consumed by consumers and eventually thrown “away”, towards a regenerative circular economy where consumption and production operate sustainably within environmental limits, securing the well-being of both current and future generations. This commitment to SCP and the Circular Economy is fully aligned and an important contributing part to the UAE’s Vision 2021 and the UAE’s Green Agenda 2030.

The Circular Economy

In a circular economy resources are not “used up” but are used again and again. Biological materials or nutrient (soil, plants, animals) are consumed and regenerated through natural biological processes while technical nutrients (plastics, synthetics, metal etc) are designed to be restored – through repair, reuse, refurbishment and recycling (as a last resort) as illustrated in the following chart. Thus, in a circular economy waste and pollution are “designed out” of the system and the system actively strives to improve the environment, not just protect it by returning valuable nutrients to the soil and ecosystem.



Policy Main Statement

The purpose of this policy is to outline some of the ways in which the UAE can transition towards a more circular economy where the country's natural, physical, human and financial resources are used in the most efficient and sustainable way to improve the quality of life of all residents while also protecting or even enhancing the local and global environment.

Transitioning to a circular economy will require concerted effort from national and local government, the private sector and general public and so this policy is also a call to action for all stakeholders in all sectors to consider how they can think and act in a more circular way to help the country transition to a successful, sustainable and happy circular economy aligned fully with the UAE Centennial 2071.

Aims of the Policy

The objectives of Circular Economy Policy are to:



Achieve sustainable management of the economy and efficient use of natural resources



Promote circular economy and Sustainable Consumption Production patterns that reduce environmental stress and meet basic needs.



Encourage the private sector to shift to cleaner industrial production methods and techniques including the use of Artificial Intelligence.

Priority Sectors

While the UAE is keen for all sectors to adopt circular economy principles, four priority sectors have been identified based on their current role in the national economy and on their potential for stimulating and developing a UAE circular economy. These are:



**Sustainable
Manufacturing**



**Green
Infrastructure**



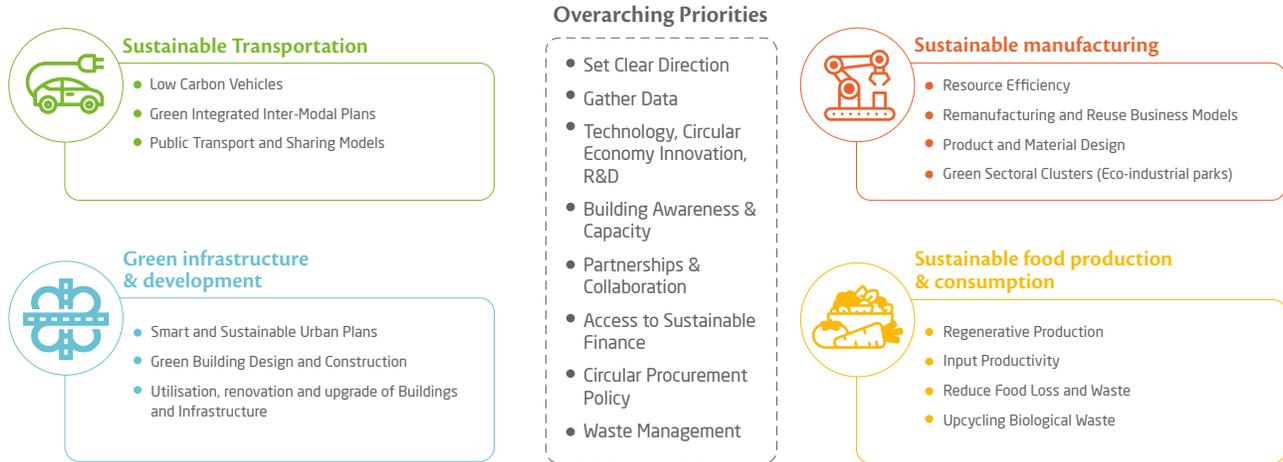
**Sustainable
Transportation**



**Sustainable food production
and consumption**

Some of key areas where circular economy strategies and principles could be applied in each of the four priority sectors are set out in the following infographic alongside the eight core enabling activities that will support transition across all sectors.

The following chart shows the main areas in which the circular economy principles can be applied in each of the four priority sectors, along with the eight common core areas of focus that will support the transition to a circular economy across all sectors.



Sustainable Manufacturing

As the largest non-oil productive sector and a significant employer, the manufacturing sector is very important to the UAE. However, the sector’s economic model of ‘take, make, dispose’ relies on consuming large quantities of finite materials and fossil fuels, which is simply not sustainable. The ‘take, make, dispose’ model is hugely wasteful, with the result that a lot of value is lost.

Priority Sectors

Through adopting circular economy strategies in the manufacturing sector, UAE is looking forward to having both imported and locally manufactured products that are more efficiently designed, manufactured, repaired, reused, remanufactured and recycled such that material and resource use and pollution is minimised and valuable materials and resources are kept in use and not lost or wasted to landfill.

Expected Outcomes & Benefits:

- Reduce GHG Emissions and other pollutants.
- Create a more productive, competitive, advanced and innovative manufacturing sector.
- Create both low and high skill green jobs.

Actions & initiatives

Some of the recommended actions that policy makers can take to achieve these outcomes and impacts in the manufacturing sector include:

Vision, Strategy, Information and Awareness	<ul style="list-style-type: none">● Increase awareness on circular economy principles and how stakeholders in the manufacturing sector and consumers can benefit. Increase awareness of the value in waste streams and to view waste as a resource, rather than hazard.● Incorporate circular economy principles (and the ReSOLVE framework) into Industrial Strategies and plans.● Collect and analyse information on resource and material flows in the manufacturing sector to identify opportunities to apply circular economy strategies.● Encourage the labelling and branding of goods produced in environmentally friendly ways.● Support the formation of accreditation and certification bodies to increase information about how goods are produced.● Disseminate material on eco-labels, the ReSOLVE framework, ecological footprint accounting, life cycle assessment, corporate sustainability reporting, and other tools.● Introduce industry awards to incentivize key players that are paving the way for more sustainable manufacturing processes.
Capacity Building and Business Support	<ul style="list-style-type: none">● Conduct capacity building workshops on applying circularity to the manufacturing sector in the UAE.● Support and extend current initiatives to assist enterprises to implement circular economy strategies and pollution prevention technologies.● Provide support/encourage businesses and business models that encourage resource and material reuse, recovery and recycling.● Encourage the development of innovative circular business models ((e.g. performance business models that allow the manufacturer to retain ownership over the products) and practices (e.g. re-manufacturing and distributed manufacturing)

	<ul style="list-style-type: none"> ● Support/encourage service-based business models which improve the efficient use of resources. ● Provide technical support on latest technologies, designs and manufacturing methods that can increase resource efficiency. ● Promote and distribute prototypes of ecological innovations in manufacturing firms, industrial parks, and industrial clusters supporting the Fourth Industrial Revolution Strategy. ● Encourage the integration of circular economy strategies in the corporate strategy and planning framework of industries ● Provide technical support and capacity building on technologies that can help manufacturers more efficiently collect, sort, separate, treat and use their waste.
<p>Research, Development & Collaboration</p>	<ul style="list-style-type: none"> ● Engage with key stakeholders to identify the barriers preventing the adoption of more circular economy strategies in the manufacturing sector and the purchase of more circular products. ● Support R&D into pollution-prevention technologies relevant to the manufacturing sector that will reduce waste and pollution. ● Support R&D into new materials, components and products that retain more value as they are reused and recycled ● Support R&D into how to more efficiently recover more value from manufacturing waste ● Support R&D into how manufacturing inputs can be more productively used. ● Convene various industrial players to share knowledge, experience, and best practices on sustainable manufacturing. ● Develop green sectoral clusters (Eco-parks) built around sustainable resources. ● Support R&D on how to more efficiently collect, sort, separate, treat and redistribute materials and products ● Support R&D into how Internet of Things (IOT) can keep track of valuable products and materials and how this can help the increased recovery of materials and products.

<p>Public Procurement & Infrastructure Investment</p>	<ul style="list-style-type: none"> ● Priorities the purchase of refurbished manufactured goods and/or goods that use reused, recycled materials and are produced using renewable energy sources. ● Develop an efficient and extensive system for collecting, sorting, separating, treating and redistributing materials and products.
<p>Legal and Regulatory Framework</p>	<ul style="list-style-type: none"> ● Analyse how the legal and regulatory framework could: <ul style="list-style-type: none"> - Encourage the import of more circular goods - Enhance the uptake of circular economy strategies in the manufacturing sector. ● support the development of a remanufacturing sector: ● be used to encourage manufacturers to use reclaimed/recycled materials in their production (or discourage use of virgin materials) ● Consider the development of minimum manufacturing standards for resource and material use and waste and pollution generated. ● Consider introducing the principle of Extended Producer Responsibility (ERP) into the legal, regulatory and policy frameworks for sustainable manufacturing.
<p>Economic Incentives</p>	<ul style="list-style-type: none"> ● Assess the potential for incentivising (through rewards/penalties) circular economy practices in the manufacturing sector and for adopting pollution prevention technologies. ● Consider pricing negative externalities (e.g. pollution) associated with manufacturing. ● Assess the potential for incentivising (through rewards/penalties) remanufactured goods and goods that use reused, recycled materials and are produced using renewable/clean energy sources. ● Consider the introduction of subsidies to encourage manufacturers to use reclaimed/recycled materials in their production and for consumers to purchase circular goods.



Green infrastructure

The infrastructure sector is inefficient, and wasteful. Around 10-15% of building materials are wasted during construction¹ and the vast majority of demolition materials are landfilled, without any value being extracted from the waste. In the UAE, construction and demolition (C&D) waste account for between 70 to 75 per cent of the total mass of solid waste produced in the UAE².

Priority Sectors

By adopting circular economy strategies in the infrastructure sector, the UAE aims to have more efficiently designed, constructed, rebuilt and demolished infrastructure where material and resource use and pollution are minimised and where valuable materials are kept in use and not lost or wasted. Likewise, it is expected to result in buildings and the wider urban environment being used more efficiently and productively.

Expected Outcomes & Benefits:

- Reduce GHG Emissions and other pollutants,
- Create more productive urban systems.
- Improve access to goods, services and housing.
- Create healthier, more liveable cities.

Actions & initiatives

Some of the recommended actions that policy makers can take to achieve these outcomes and impacts in the infrastructure sector include:

<p>Vision, Strategy, Information and Awareness</p>	<ul style="list-style-type: none"> ● Develop Smart and Sustainable Urban Plans with city designs that are more conducive to the effective reuse, collection, and redistribution of resources such as water, organics, industrial by-products, building elements, and household recyclables. ● Increase awareness of new materials and construction methods that require less materials and create less waste. ● Increase awareness about value in waste streams.
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¹ Ellen MacArthur Foundation, SUN, And Mckinsey Center For Business And Environment, Growth Within: A Circular Economy Vision For A Competitive Europe (2015)

² <https://bpace.buid.ac.ae/bitstream/1234/775/1/2013117050.pdf>

	<ul style="list-style-type: none"> ● Collect and analyse information on resource and material flows in the infrastructure sector to identify opportunities to apply circular economy strategies.
<p>Capacity Building and Business Support</p>	<ul style="list-style-type: none"> ● Support businesses to incorporate circular economy principles into building designs and into construction design methodologies and approaches. ● Support the adoption of industrial construction processes such as prefabricated building elements, offsite construction, and 3D printing which can significantly reduce material demand and waste generation while also reducing material costs and increasing productivity. ● Develop programmes to support the reuse and recycling building materials to reduce Construction and Demolition waste (CDW) including the better design of materials for reuse and disassembly and high-value recycling ● Support/promote businesses and business models that refurbish and renovate existing assets to make them more efficient ● Support/encourage service-based business models such as renting, sharing, pay-per-use models and Energy Service Companies (ESCOs) that will increase the utilisation and efficiency of buildings and urban spaces. ● Conduct capacity building workshops on applying circularity to the infrastructure sector in the UAE ● Magnify international cooperation and capacity building support in water efficiency, water harvesting, recycling, and reuse.
<p>Research, Development & Collaboration</p>	<ul style="list-style-type: none"> ● Support R&D into improved building and infrastructure design and development of new high strength materials that result in infrastructure assets that have the same structural strength as traditionally built infrastructure but use significantly less materials and generate less waste during construction. ● Conduct R&D into how to increase the functional lifespan of assets ● Support R&D into designing building materials for reuse and for disassembly and high-value recycling. Likewise, support R&D and use of technology to collect information about a building's material composition. ● Develop/support public-private partnership and collaboration platforms for stakeholders in the infrastructure sector to develop and adopt circular economy strategies.

	<ul style="list-style-type: none"> ● Collaborate with planning, engineering, and construction professional bodies to develop building and urban development programs and standards for the establishment of compact urban spaces, spaces for pedestrians and cyclers, green roofs, as well as green community spaces in residential zones as tools to promote green social integration and cohesion. ● Include R&D, incubators for new ideas, benchmarks, and youth programs as part of the overall campaign for circular economy in the infrastructure and transport sector. ● Organize a "Circular Economy Week" to facilitate dialogue between policymakers and frontrunners from the private sector on the policy support necessary for the private sector to embrace Circular Economy through a collaborative platform. ● Engage with key stakeholders to identify the barriers preventing the adoption of more circular economy strategies in the Infrastructure sector.
<p>Public Procurement & Infrastructure Investment</p>	<ul style="list-style-type: none"> ● Develop cities that are more compact, transit-oriented, and dense with mixed-use neighborhoods that create favorable conditions for both shared mobility (e.g. buses, trams, rideshares) and active mobility options (e.g. walking bicycling). ● (Re)vegetate the built environment ● Incorporate circular economy principles into construction design methodologies and approaches used by public sector entities ● Support the development of infrastructure designed in a modular, flexible and durable way ● Increase the functional lifespan of assets and can ensure that the assets are capable of being adapted to changing user needs and can also be more easily maintained and renovated. ● Design assets are capable of being adapted to changing user needs and can also be more easily maintained and renovated. ● Adopt pioneering methods on the implementation of holistic approaches - integrating social, environmental, and economic dimensions - to sustainable urban development in terms of planning, design, construction, and in the surrounding built environment (e.g., incorporation of Best Available Techniques and Best Environmental Practices in eco-design).

	<ul style="list-style-type: none"> ● Capitalize on the use of local, reused, recycled, and recyclable materials in the construction sector to promote sustainable management of construction activities.
<p>Legal and Regulatory Framework</p>	<ul style="list-style-type: none"> ● Analyse how the legal and regulatory framework could support and promote the better utilisation of urban space, assets and materials ● Develop regulatory framework to support use of Recycled Product / Material over Virgin Material ● Incorporate circular economy principles into Green Building Standards and support the development of infrastructure designed in a modular, flexible and durable way. This will include the following principles: <ul style="list-style-type: none"> - Use less material. - Extract maximum value from resources. - Select construction materials with low carbon intensities. - Select local materials, minimising material transportation; and - Use renewable energy for materials transportation. ● Analyse how the legal and regulatory framework could further support and promote the refurbishment and renovation of existing assets to make them more efficient as well as the better utilisation of existing buildings and urban spaces. ● Advance sustainable building and construction policies in all emirates including green building codes and obligatory energy audits.
<p>Economic Incentives</p>	<ul style="list-style-type: none"> ● Develop measures to stimulate the better utilisation of urban space, assets, and materials (such as steel, aluminium, cement, and plastic) and measures to revegetate the built environment ● Develop measures to increase the functional lifespan of buildings and infrastructural assets ● Develop economic incentives to reduce the demand for virgin materials and increased use of waste streams ● Develop measures to further support and promote the reuse, refurbishment and renovation of existing assets to make them more efficient as well as the better utilisation of existing buildings and urban spaces.



Sustainable Transport

The transport sector in the UAE is currently dominated by personal car use and consequently, passenger vehicles were responsible for approximately 15% of the UAE's carbon emissions, and, at the end of their life, vehicles create a considerable amount of untapped waste.

Priority Sectors

By adopting circular economy strategies in the transport sector, the UAE expects that people will more easily be able to move quickly and safely throughout the country using modes of transport that do not pollute the environment, nor create congestion.

Expected Outcomes & Benefits:

- Reduced GHG Emissions and other pollutants (including air pollution).
- Reduce congestion and travel times.
- Create more liveable and healthier cities.
- Reduce the number of traffic accidents.
- Increase access to jobs and services.

Actions & initiatives

Some of the recommended actions that policy makers can take to achieve these outcomes and impacts in the transport sector include:

Vision, Strategy, Information and Awareness	<ul style="list-style-type: none">• Develop and implement a Smart Sustainable transport plans that are fully integrated across different modes of mobility (such as walking, public transport, ride-sharing and car-sharing) at local and national levels that enable people to seamlessly shift between personal, shared and public transport• Promote virtual and flexible working• Develop new labels for low-emission vehicles; use current standards such as vehicle registration to track efficiency and number of vehicles in the country.
Capacity Building and Business Support	<ul style="list-style-type: none">• Support businesses and business models where individualised mobility is provided as a service and vehicles are more fully utilised.

Research, Development & Collaboration	<ul style="list-style-type: none"> ● Promote and support the integration of public and private, local and regional modes of transport ● Promote R&D into how digital platforms and AI can ensure seamless shifting from one mode of mobility to another and can reduce travel times. ● Establish strategies to build strong Public-Private Partnership (PPP) in sustainable transport projects to facilitate private sector contribution in shaping the future development of the transport sector in different capacities
Public Procurement & Infrastructure Investment	<ul style="list-style-type: none"> ● Further develop and manage a well-designed circular mobility system which offers more transportation choices that are shared, electrified, autonomous and multi-modal. ● Further develop the charging infrastructure to support electric vehicles ● Expand development of new concepts in mobility and transport such as e-scooters or biking and build more designated lanes such as within the facilities of universities and similar suitable public areas
Legal and Regulatory Framework	<ul style="list-style-type: none"> ● Ensure the legal and regulatory frameworks support electric vehicles, autonomous vehicles and the concept of mobility as a service; ● Ensure the legal and regulatory frameworks support Low Carbon Fuel. ● Ensure the legal and regulatory frameworks supporting compliance to CORSIA of ICAO and MARPOL-2020 of IMO ● Assess how the policy, legal and regulatory frameworks could further support transition to a circular economy in the transport sector. ● Update minimum requirements (e.g., fuel efficiency requirements and emission limits for vehicles)
Economic Incentives	<ul style="list-style-type: none"> ● Assess how financial penalties and rewards could be used to reduce congestion and structural waste in the transport sector (encourage use of public transport, uptake of electric vehicles) ● Consider the introduction of subsidies to encourage manufacturers to use reclaimed/recycled materials in their production and for consumers to purchase circular goods.



Sustainable food production and consumption

Although less than 10% of food consumed in the UAE is produced in the UAE and the agricultural sector only generates a very small proportion of the country's GDP, the agricultural sectors accounts for around 60% of the UAE's freshwater demand and so can significantly affect water scarcity. Conventional (linear) agricultural production methods are quite wasteful with only around 20% of the water withdrawn for agricultural activities³ consumed by people and only 5% of the fertiliser applied to land providing nutrients to the human body.⁴

Priority Sectors

By adopting circular economy strategies in the food sector, the UAE expects that its ecosystems will be healthier, its food healthier and more nutritious, its food wasted reduced and its organic wastes more productively used.

Expected Outcomes & Benefits:

- Reduce GHG Emissions and other pollutants (and possibly even sequester carbon in soils.)
- Improve the overall health of the UAE's ecosystem.
- Increase the public's access to healthy and nutritious food.

Actions & initiatives

Some of the recommended actions that policy makers can take to achieve these outcomes and impacts in the food sector include:

<p>Vision, Strategy, Information and Awareness</p>	<ul style="list-style-type: none"> ● Encourage the labelling and branding of food produced in regenerative ways. Institute quality control, traceability, and certification programs to authorize products produced regeneratively ● Incorporate sustainable food production and consumption in the school curriculum; to help educate the youth on the importance of nutritionally balanced diets and food security in a changing climate ● Increase awareness on circular economy principles and how stakeholders in the agricultural and fisheries sector can adopt the principles into their operations.
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³ The rest of the water is lost in conveyance, not absorbed by crops once applied to fields, used to create non-edible parts of crops or lost through wasted food that is not consumed. Ellen MacArthur Foundation, SUN, And Mckinsey Center For Business And Environment, Growth Within: A Circular Economy Vision For A Competitive Europe (2015).

⁴ The other 95% of fertiliser applied to land is, like water, either not absorbed by crops (50-70% is not absorbed), is used to create non-edible parts of crops (which are currently discarded as waste), is lost through wasted food that is not consumed or is just simply not absorbed by the human body as it does not absorb all nutrients consumed. Ellen MacArthur Foundation, SUN, And Mckinsey Center For Business And Environment, Growth Within: A Circular Economy Vision For A Competitive Europe (2015) and IFDC, [http://www.ifdc.org/Technologies/Fertiliser/Fertiliser_Deep_Placement_\(UDP\)](http://www.ifdc.org/Technologies/Fertiliser/Fertiliser_Deep_Placement_(UDP)), 2015

	<ul style="list-style-type: none"> ● Incorporate circular economy principles (and the ReSOLVE framework) into Agricultural Plans and Investment guides ● Collect and analyse information on resource and material flows in the agricultural sector including food loss and waste in the supply chain to strengthen understanding of value in food loss waste. ● Strengthen public awareness and information dissemination campaigns on the concept of nutritional standards and food waste reduction such as consumer education on best-before and use-by labels and reducing food waste in social gatherings such as weddings and religious celebrations. ● Introduce quality assurance schemes to enhance quality of organic fertilizers.
<p>Capacity Building and Business Support</p>	<ul style="list-style-type: none"> ● Support food producers (farmers, fishermen and others) to develop a regenerative mindset focused on yield and quality and provide marketing support to local producers that grow in a regenerative way. ● Support the importation of food grown in regenerative ways ● Provide technical support to farmers on latest agricultural methods (e.g. precision farming, regenerative agricultural techniques) and technologies (AI, IOT, big data, remote sensing) that can increase productivity of inputs and reduce waste and externalities including improved irrigation and use of recycled water ● Provide support to the development of urban farming. ● Support the development and growth of businesses, bioeconomy entrepreneurs and business models that reduce food waste (for example by providing training and information on best practices including the better matching of supply and demand for food and the up-cycling of food) ● Intensify the use of innovative technologies such as detection technology to avoid infestation that would later render the crops unsuitable for human consumption, technology to protect food from pest and moisture during post-harvest storing and processing and the use of Big Data and IT to improve inventory management ● Support the production and usage of energy and compost from municipal or agricultural waste.

Research, Development & Collaboration	<ul style="list-style-type: none"> ● Support R&D into regenerative agricultural and fishing practices ● Support research into organic fertilisers (how to make them easier to use and competitive with synthetic fertilisers, improve scientific evidence regarding micropollutants) ● Support R&D into methods and technologies that can increase input productivity, enhance resource efficiency and reduce externalities associated with agricultural production ● Provide platforms where stakeholders from the agricultural and technology sectors including those from the 4th Industrial Revolution (4IR) can collaborate on improving the circularity of food systems. ● Identify the gaps and challenges preventing the adoption of more circular economy strategies in the agricultural sector ● Engage stakeholders from across the food industry to form partnerships to reduce food loss waste. ● Support R&D into how to better segregate, sort and manage organic waste flows and extract maximum value from the waste through for example new technologies and business models. ● Support research into food-processing biotechnologies that can expand the range of potential uses for food by-products ● Support R&D into the development of new plant-based proteins.
Public Procurement & Infrastructure Investment	<ul style="list-style-type: none"> ● Restore damaged ecosystems. ● Endorse the procurement of agricultural products produced using circular economy principles. ● Support programmes and initiatives that seek to reduce food loss and waste ● Support the development of platforms and marketplaces that connect food producers to consumers (turning waste streams into revenue streams) ● Invest in better storage and logistics for the agricultural sector.
Legal and Regulatory Framework	<ul style="list-style-type: none"> ● Analyse how legal and regulatory framework could: <ul style="list-style-type: none"> - Promote regenerative food production and consumption, including importation. - Enhance the uptake of new technologies and methods. - Support the reduction in food waste and healthier diets.

	<ul style="list-style-type: none"> - Enhance the extraction of value from biological waste streams and regenerate ecosystems ● On the basis of this analysis, formulate a legal and regulatory framework that would support a circular agricultural sector.
Economic Incentives	<ul style="list-style-type: none"> ● Analyse how financial incentives or penalties could be used to encourage: <ul style="list-style-type: none"> - Sustainable production and consumption of food grown in a regenerative way. - The uptake of new technologies and methodologies that will increase resource efficiency. - The transformation of organic and food waste into raw material and integrate again through circular economy to the cycle. ● Develop financial instruments, programs, and investment schemes that strengthen the links between financial institutions and food producers and manufacturers to implement circular economy principles.

Expected Benefits of Transitioning to a Circular Economy

Transitioning to a circular economy is expected to lead to a number of economic, environmental and social benefits including:

- **Increased disposable income** through reduced cost of products and services and a conversion of unproductive to productive time (for example, reduction in congestion cost). In turn, this could increase consumption and therefore increase GDP growth. A Study by the Ellen MacArthur Foundation⁵ on the potential impact of Europe transitioning to a circular economy found that the disposable income of the average European household could increase 18% by 2030 and 44% by 2050 in a circular economy, compared to just 7% and 24% in a business as usual scenario.
- **Reduced demand for virgin materials and a reduction in CO2 emissions**
- **Positive employment effects.** Existing studies⁶ suggest that a circular economy can have a positive employment effect, largely due to increased spending fuelled by expected lower prices across sectors.
- **Improved quality of life.** Cities will be more liveable with better access to goods and services and people healthier from reductions in air pollution and access to healthier, more nutritious food.

⁵ Ellen MacArthur Foundation, SUN, And Mckinsey Center For Business And Environment, Growth Within: A Circular Economy Vision For A Competitive Europe (2015)

⁶ Ellen MacArthur Foundation, SUN, And Mckinsey Center For Business And Environment, Growth Within: A Circular Economy Vision For A Competitive Europe (2015)

Transitioning to a Circular Economy

The transition to a circular economy will require the concerted effort of public and private stakeholders from across sectors at the national and regional level. The circular economy rests on three key principles:⁷

1. **Preserve and enhance natural capital** by controlling finite stocks and balancing renewable resource flows.
2. **Optimise resource yields** by circulating products, components, and materials at the highest utility at all times in both technical and biological cycles.
3. **Foster system effectiveness by revealing and designing out negative externalities**, such as water, air, soil, and noise pollution; climate change; toxins; congestion; and negative health effects related to resource use.

The UAE economy is one of the most competitive economies in the world and it continues to utilize advanced technologies to become one of the leading digital economies in the world. As the government has made high tech sectors a top priority for the new economy of UAE, Circular Economy becomes highly important component of the UAE's economic policy. In this regard, the UAE will utilize its federal, local and private sector partnerships along with those international strategic partnership to implement the Circular Economy policy recommendations and agenda.

Government's Role in the Transition

There are several barriers hindering the transition to a circular economy, including "market failures", "regulatory failures" and other barriers. The Government will seek to overcome these barriers, however in addition, policy makers at all levels and across sectors in the UAE can also take a more active role to stimulate the transition to a circular economy, through:

- Setting a clear direction. Incorporate circular economy principles and strategies into sector strategies, plans and policies.
- Collecting, sharing, monitoring and analysing Circular Economy data and information. Data on how resources and materials flow through the economy and how to measure success in circular economy.
- Conducting circular research and development (R&D) into technologies, methodologies and business models that support the Circular Economy and leverage new technologies to maximise overall benefits. Utilise new technologies and develop system-level circular economy innovations.
- Increasing awareness and building capacity (including retraining) among key stakeholders on technologies, methodologies and business models that support the circular economy. Raise awareness and understanding on the concept and principles with public officials, business leaders and the public.

⁷ Ellen MacArthur Foundation, Delivering the Circular Economy – A Toolkit For Policymakers (2015)

- The creation of partnerships and collaboration platforms. Bring groups together to identify circular economy opportunities, address barriers and learn from each other.
- Ensuring access to sustainable finance. Help remove barriers to finance and provision of finance.
- The development and implementation of circular public procurement policies. Use purchasing power to create and growth markets for circular goods and services.
- Better management of waste. View waste as a source of valuable materials and products, not a hazard, separate waste, reduce generation of waste and invest in material reuse and recycling infrastructure.

A Clear Direction

The government at federal and local level, can play a vital role in setting a clear direction for the circular economy. By incorporating circular economy principles and strategies into sector strategies, plans and policies, the government can clarify how they see circularity unfolding in different economic sectors, including ambitions, targets, investments and trade-offs. This will help CEOs and others to understand the extent to which future markets will be oriented towards circularity. They could also undertake a more in-depth analysis to identify specific circular economy opportunities for particular sectors and value chains important to the UAE. This analysis could include identification of barriers, a roadmap for how the opportunities could be realised and barriers addressed, and a study of the economy-wide implications of realising this circular economy opportunity.



Data Generation

There are currently considerable gaps in our knowledge about how resources and materials flow through different sectors. Historically, collecting such data was extremely difficult, costly and time-consuming. New technologies including the Internet of Things (IOT), Big Data, artificial intelligence (AI) and Geographic Information Systems (GIS) are making it more possible than ever to keep track of valuable products and materials, opening up many new circular economy opportunities that previously were not possible. To make informed decisions on how to best help the transition to the circular economy, it is vital that accurate, timely, accessible and easy to use data is collected, monitored, analysed and shared with all relevant parties. Current gaps in data on factors and issues important for the circular economy should be identified and prioritised with plans drawn up on how they can be filled or what proxies can be used. Of particular importance, will be collection of data to monitor progress in the

transition to a circular economy and to identify potential CE opportunities at local and national levels and for individual sectors of importance .

Thought should also be given on how to measure economic success in a circular economy. Under the current economic paradigm, economic success is measured almost exclusively in terms of a flow metric (GDP), with economic policies designed to maximise this flow. A circular economy puts more emphasis on measuring the value of assets (both technical and environmental) and develops principles and policies to preserve and increase their value. The circular economy thus would focus equally on improving the value derived from the stocks and flows of both ecosystem assets, as well as technical assets. Economic success in a circular economy would therefore be measured and reported in a manner more similar to how success in the oil and gas sector is measured and reported, using the language of reserves (possible reserves of assets (environmental and technical), probable reserves and proven reserves).

The UAE has long recognised the shortcomings of the GDP metric to measure economic performance and wellbeing and therefore regularly monitors a range of metrics, including a happiness indicator and environmental performance indicator, to better understand performance and guide policy. The circular economy is expected to increase consumer utility, however because of the way GDP is calculated, this may not be well reflected in the GDP metric, in the same way that the benefits of sharing and digitisation have also not been well captured by GDP. Thus, it will become even more important to use a balanced set of metrics to measure the success of its economy, metrics more aligned consumer utility and public expectations.

Technology, Innovation, Research and Development

The technology and digital revolution will play a vital role in the transition to a circular economy. The technologies of the 4th Industrial Revolution (4IR), such as smart phones, have already enabled new sharing and virtualisation business models (e.g. car-sharing) and offer the potential to unleash many more circular economy opportunities. AI, for example, can offer significant improvements in product design, operations and infrastructure optimisation. The existence of new technologies that will improve resource productivity will not however automatically ensure that circular economy opportunities are realised. For example, autonomous vehicles will not automatically induce share at scale or very high utilisation rates if not integrated into an inter-modal system and precision farming will not automatically close nutrient loops, regenerate lands or remove waste from the value chain despite creating significant synthetic fertiliser savings. For circular economy opportunities (and their substantial associated benefits) to be realised, Governments at different levels will need to actively work on system-level circular economy innovations to integrate new technologies effectively into (urban planning, transport and food) systems and to discourage rebound effects so that structural waste in those systems can be reduced and all the potential

opportunities and benefits of the circular economy realised. Thus, without circular economy strategies, some of the potential benefits of 4IR technologies will be lost.

Important ways to help the transition to the circular economy will be through learning and research initiatives, undertaken in collaboration with a broad range of public and private stakeholders, domestically and internationally to understand the near and medium term circular economy opportunities and implications for different industries and sectors. Initiatives could include:

- Pilot studies to test aspects of the circular economy in the local context.
- Demonstration projects to show how circular principles work in practice.
- Collaboration platforms/groups to help identify opportunities across supply chains and sectors.
- Academic research on circular economics, new materials, methodologies and processes.

Growing a circular innovation ecosystem to accelerate the adoption of 4IR solutions for the circular economy will thus also be important. The UAE has already taken steps to do this by becoming the first signatory to the 'Scale 360' initiative, a World Economic Forum initiative that brings together global partners to fast-track forth industrial revolution (4IR) impact in the circular economy by supporting bottom up innovation, particularly in the sectors of electronics, fashion, food, and plastics.

Awareness and Capacity Development

Adopting circular economy principles is to adopt a new way of thinking and implies systemic and pervasive change. Having grown up with linear production systems and consumption patterns, business executives and consumers seldom look for circular opportunities. Worse, inertia and resistance to change can also pose a significant barrier to the transition to a circular economy. Therefore, there is a clear need for initiatives to raise awareness and understanding on the concept and principles with public officials, business leaders and the public. There is also a need to build capacity in areas important for the circular economy, including in design and planning of goods, services and systems and in applying and implementing new technologies, methodologies and business models. Capacity building and awareness initiatives may include trainings and workshops, development of manuals or guidelines, multi-stakeholder networking and knowledge sharing events, and information dissemination campaigns.

While the transition to the circular economy will lead to overall benefits for society, there will be some sectors, companies and individuals that will be adversely affected by the change. Groups disadvantaged by the changes should also be targeted and helped through retraining and other forms of support.

Partnership and Collaboration

Transitioning to a circular economy, implies systemic change. It thus necessitates comprehensive engagement and active participation of public sector entities (national and local), private sector, academia, and civil society groups. It can also involve engaging with the international community. Government can play an important role by bringing these groups together to identify circular economy opportunities, address barriers and learn from each other. The circular economy also offers significant public private partnership (PPP) opportunities.

Sustainable Financing

Since circular economy projects apply new technologies and business models, many in the financial sector argue that their projects are inherently risky and often not bankable. Consequently, inadequate access to financing poses a potential barrier to the widespread adoption by the private sector of more circular practices. The government can play a key role in removing these barriers by collaborating with the finance industry to identify specific barriers and potential solutions and also through public private partnership arrangements. Moreover, the government could also directly provide financing, for example at early stage development of new technologies, where the financial sector may be unwilling this could be through new or existing funds. The government could also support 'Circular Economy' initiatives through green incentives

Public Procurement

Every year public authorities in the UAE at the local and national level procure millions of Dirhams worth of goods and services. Thus, the government can use the significant purchasing power to help create a market for circular goods and services by adopting more circular procurement practices. This could be done by incorporating circular economy principles and standards into procurement law or guidelines; by developing a list of preferred suppliers or materials that meet circular economy principles and by building up the capabilities and skills of procuring departments in circular economy concepts such as total cost of ownership (TCO) and measures of material circularity.

Waste Management

Waste is too often treated only as an environmental hazard to be disposed of safely, rather than as a source of valuable materials and products. Regulations, legislation and contracts could be revised to try to ensure that waste is viewed more as potential resource such that waste managers will be more incentivised to separate waste with a view to reuse or remanufacture and recycle in a way that more value is retained. More investment can also be made into developing material reuse and recycling infrastructure and in digital infrastructure, such as digital material tracking that can enable end-to-end tracking of materials, can help identify materials for reuse as they come to the end of their (first) life, thereby retaining value over time and encourage tighter looping. Such tracking

will also increase knowledge about material and component composition. As well as dealing with waste, there is also a role for addressing the generation of waste and considering how rules and regulations on packaging and producer responsibility, for example, can affect this. Finally, setting targets on quantities of waste generated and on the proportion of waste that is recycled and converted into energy can also be helpful.

Circular Economy and the COVID-19 Pandemic

Following the massive disruptions caused by the COVID-19 pandemic, the UAE government is committed to accelerating recovery and advancing growth while at the same time protecting the environment. The green and circular economy have therefore been identified as priority areas for the UAE in the post-COVID-19 world. Transitioning to a more circular economy will enable the UAE to unlock new sustainable economic opportunities and to build back a stronger, more resilient, more sustainable, prosperous, and happy nation.

Circular investment opportunities that could be particularly promising as part of long term post-COVID19 recovery and stimulus package include:⁸

- The renovation and upgrade of buildings for adaptable use, durability and positive impact, including investment in digital innovation to achieve further environmental benefits.
- Investments in developing building material reuse and recycling infrastructure.
- Investments in digital infrastructure (e.g. tracking technology and digital modelling) that can accelerate the transition to circular built environment.
- The increased development of multimodal mobility infrastructure and the investment in digital infrastructure to help integrate all modes of transport.
- Investing in facilities that refurbish, remanufacture, and recycle vehicle parts and more generally recycling facilities that keep high-value materials in circulation.
- Investing in reuse business models that help reduce the need for single-use packaging and products;
- Investing in tools that enable farmers to shift to regenerated agricultural production models to create food systems that allow people and nature to thrive.
- Investing in tools that help to establish a market for food grown using regenerative methods.
- Increasing food collection, redistribution and valorisation infrastructure to make the most of food and improve food security (digital infrastructure, particularly food flow mapping technologies, will play a key role here).
- Adopting green procurement strategies that favour circular products and services.

⁸ Identified by the Ellen MacArthur Foundation

These circular investment opportunities will reinforce and complement the UAE’s other Post-COVID-19 priority areas: the digital economy and food security.

Implementation Plan and Indicators to Monitor Progress

During the first year of the policy, the government will develop in consultation with stakeholders a detailed implementation plan for the transition to a circular economy that will identify Specific Measurable Achievable Relevant Timebound (SMART) targets. The plan will also allocate clear roles and responsibilities to key stakeholders, including responsibility for monitoring and evaluating progress using key performance indicators. Some potential indicators that could be used to monitor progress are set out below.

Economic Performance Indicators
The number of classified companies operating in the principles of the circular economy
The size of companies
The value of assets and investments for each company
The contribution of rated companies to the GDP
The volume of import, export and re-export of classified companies
The annual growth rate of the listed companies
The number of major import and export countries
Percentage of financing from local or international banks
The number of economic sectors served by the classified companies
The number of employees for each company classified

Performance Indicators for Renewable Energy and Greenhouse Gas Emissions
Renewable and clean energy production as proportion of total production
CO2 emission per unit of GDP

Performance Indicators in Resource Productivity
Domestic material consumption per unit of GDP
Energy consumption per unit of GDP
Water consumption per unit of GDP

Performance Indicators in Waste Generation
Hazardous waste generated per unit of GDP
The per capita hazard of waste generation and the proportion of hazardous waste treated, according to the type of treatment
Construction and demolition waste generated per unit of GDP (or per unit construction value added)
Municipal solid waste generation intensity (kg / person / day)
Global food loss index

Resource Productivity Indicators
Percentage of recycled waste as proportion of the total waste generated (hazardous and non-hazardous)

Next Steps and Policy Timeframe

The policy covers the period 2021 to 2031. The following diagram summarizes some key action and outputs.

