

# CIRCULAR ECONOMY IN BUILT ENVIRONMENT

*A Waste Management Perspective*

Presented By

**FARNEK**

in association with

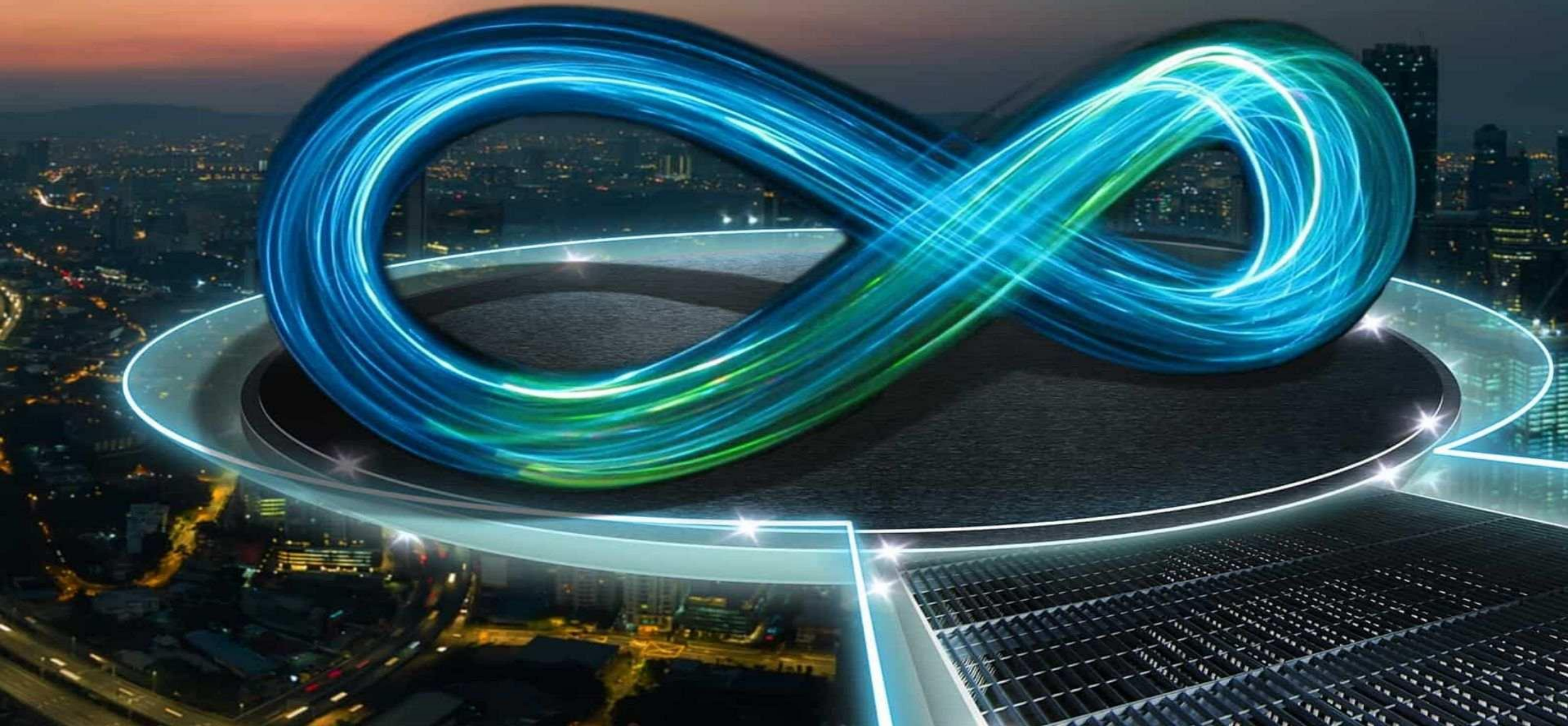
**EMIRATES GBC**

25-May-2021

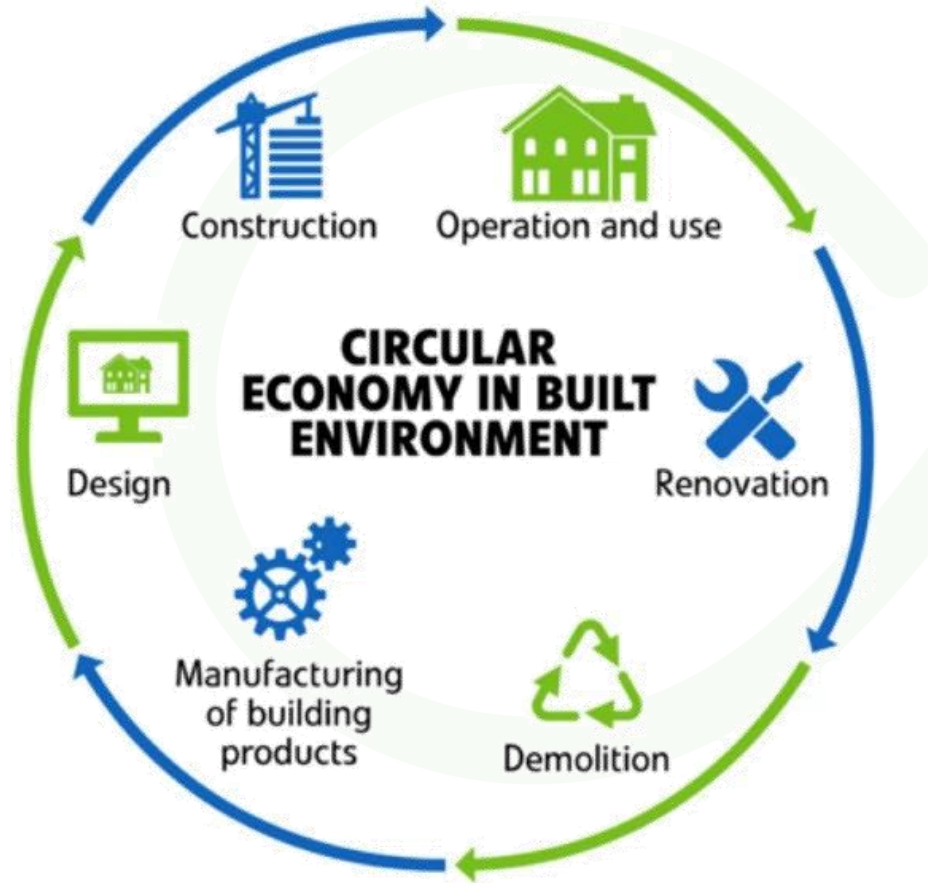
# AGENDA

- 1. Defining Circular Economy : In context**
- 2. Approaches to Circular Economy for Built Environment**
- 3. Circular Economy as a source of Revenue & Resource Optimization**
- 4. Circular Economy in UAE : Problems and Prospects**

# DEFINITION



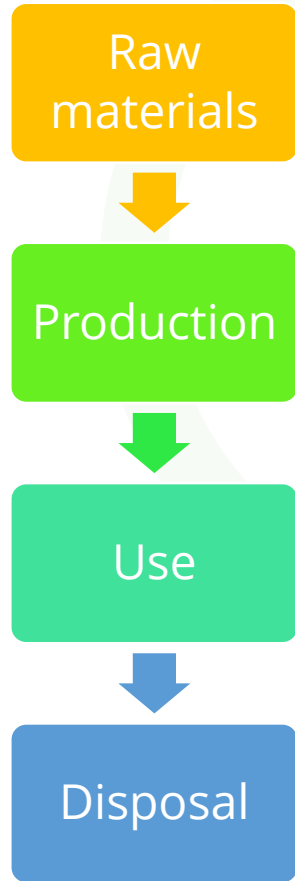
# A BROAD FUTURISTIC CONCEPT



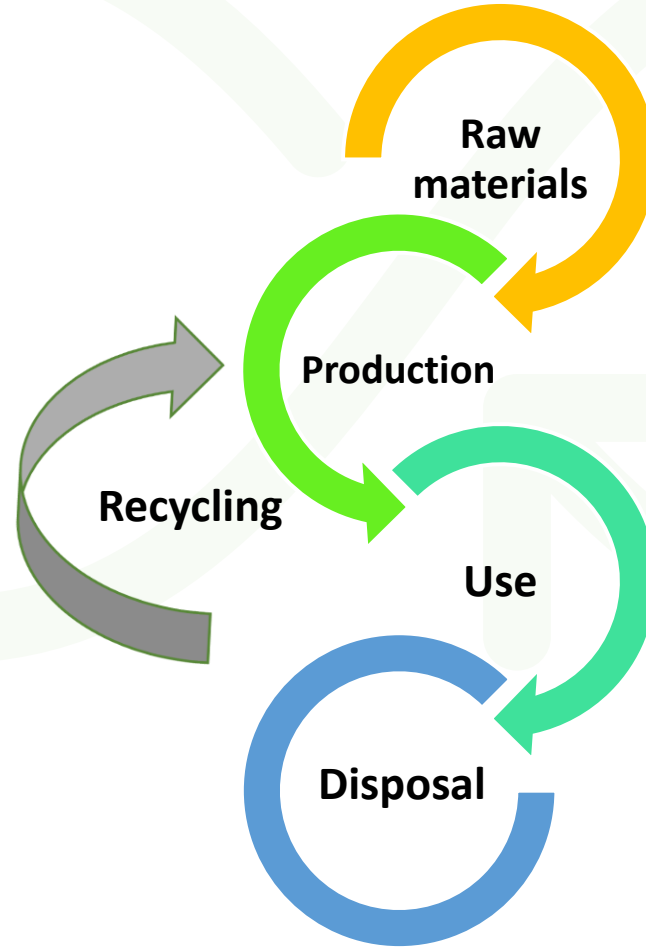
A circular economy is an economic system of closed loops in which raw materials, components and products lose their value as little as possible, renewable energy sources are used and systems thinking is at the core

# SUSTAINABLE ECONOMIC MODEL

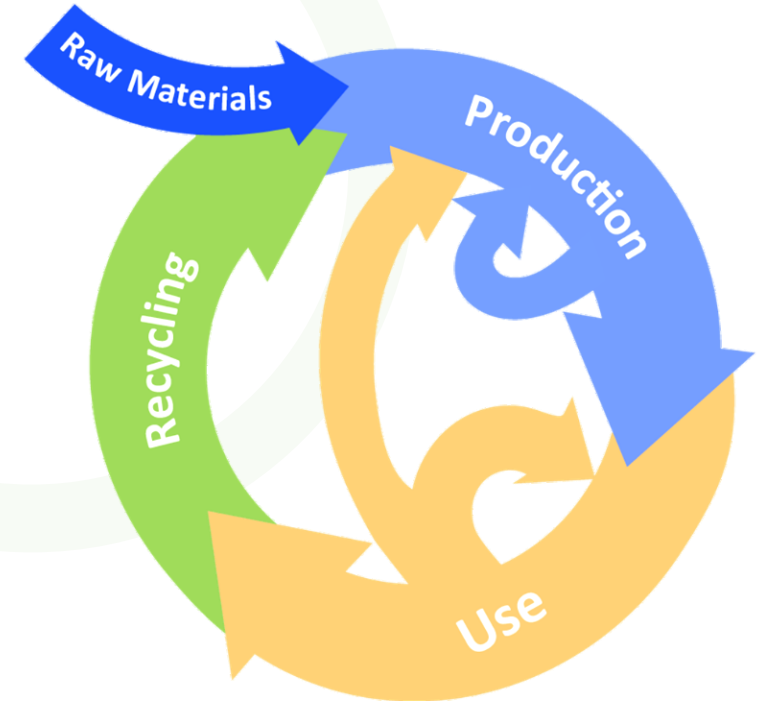
## LINEAR ECONOMY



## RECYCLING ECONOMY



## CIRCULAR ECONOMY



# GLOBAL POLICIES

1. **UK: Climate Change Act 2008**  
(preceded the OK circular economy concept)
2. **BS 8001 - 2017**
3. **ISO/TC 323 - 2018**
4. **Platform for Accelerating the Circular Economy (PACE) - 2018**
5. **EU Action Plan for the Circular Economy- 2020**



# WASTE – A key aspect in Circular Economy

- **Rapid Urbanization**
- **Increasing throw and use culture**
- **Lesser life span of materials**
- **Waste management requires substantial investment**
- **Market fluctuations/ instability – demands**
- **Safety & health concerns**

*Circular Economy is not about Reuse or Recycling, it's a cultural change*

# Why is Construction and the Built Environment targeted by the Circular Economy Strategy?





World's **largest consumer** of raw materials

**70%**  
global CO2 emissions from Cement industry

**75%**  
of worlds timber utilized

**40%**  
of annual GHG's emitted by buildings

**10-15%**  
building material wasted

**60%**  
office spaces are not utilized

**20-40%**  
energy in existing buildings can be saved

**60%**  
of construction waste landfilled



TAKE

MAKE

WASTE

FARNEK.COM  SMART AND GREEN FM COMPANY

# OPPORTUNITIES FOR THE BUILT ENVIRONMENT





**The circular approach helps minimize the environmental footprint of the built environment sector by taking control of the waste, potentially extend lifecycle time of the products while reducing the lifecycle costs; it will also help avoiding construction delays and other consequences that are related to the volatility of commodity markets in procuring virgin materials.**

# 1: POLICIES

- Nation wide policy for circular economy
- Set guidelines for the construction sector
- Incentives to promote innovators & entrepreneurs
- Structured supply chain for material/ waste exchange between generators and users
- Establish upstream and down stream upcycling & recycling industries
- Renewable energy strategies & carbon reduction targets



## 2: DESIGN - for Adaptability & Deconstruction

- **DESIGN FOR DECONSTRUCTION** – ease of replacement/ Can be thought of as the reverse of the construction process
- **MATERIALS WITH A LONGER LIFE SPAN** – reducing replacement repair/requirement
- **FLEXIBILITY IN AREA & HEIGHTS** - allowing future change of use/additional services
- **MODULAR CONSTRUCTION** - Allows buildings to be systematically taken apart piece by piece so elements can be reused

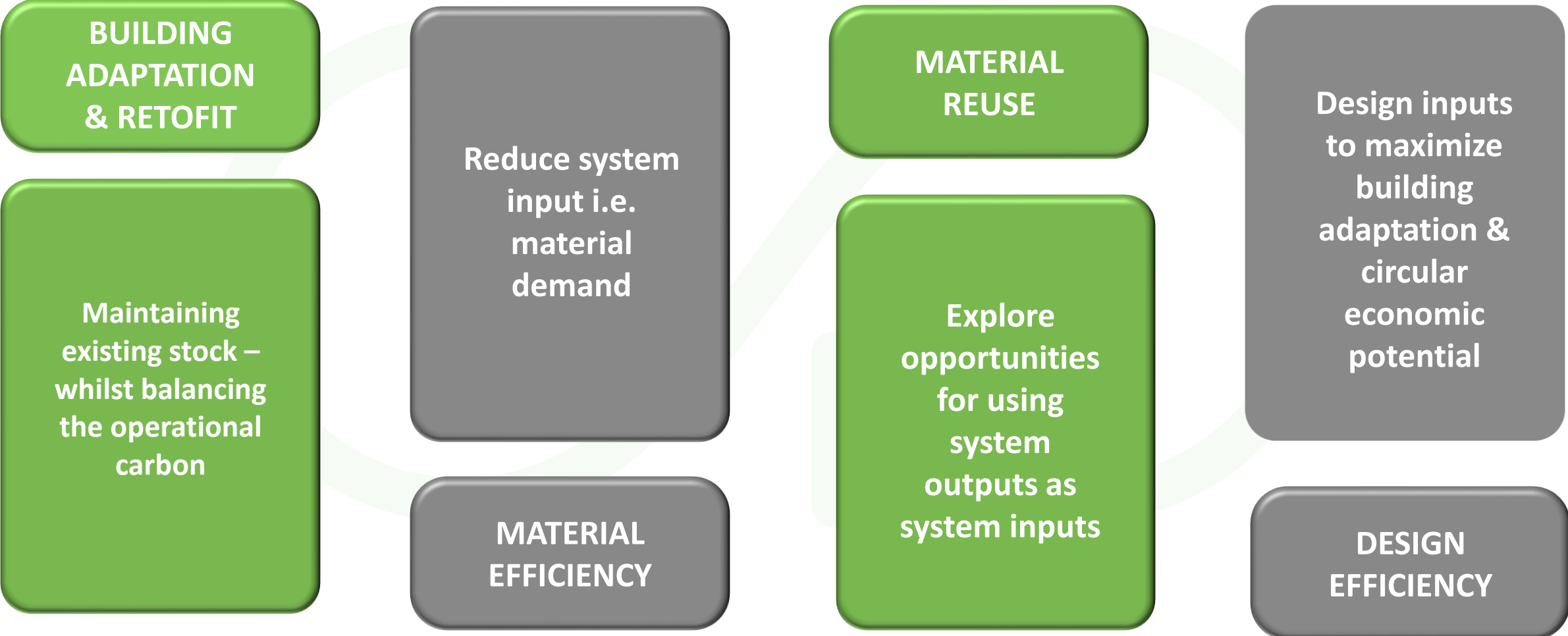


### 3: SUSTAINABLE PURCHASING – Materials & Services



- Leasing or renting assets rather than purchase
- Seeking to use redeployed assets for new projects
- If buying new assets, use higher quality products to increase product life
- Higher quality servicing & maintenance to increase product life
- Looking for options to redeploy assets at the end of the life
- Buy a service rather than a product – new circularity approach

# 4: MATERIALS MANAGEMENT – Reducing Embodied Carbon



# A SOURCE OF REGENERATIVE ECONOMY

- Design out waste and pollution – Minimizing the waste produced in construction and deconstruction processes to reduce the negative impact of economic activity on natural systems with the objective of ensuring that equipment and components are recyclable at the end of their service lives.
- Keep products and materials in use – Maximizing the life expectancy of materials through refurbishment and recycling of materials and components.
- Regenerate natural systems – protecting natural resources to create a more resilient ecosystem.
- Promoting local sourcing - give a big boost to the local industries





An aerial photograph of Dubai, UAE, at sunset. The Burj Khalifa is the central focus, towering over the city. The sky is a mix of orange, pink, and blue. In the foreground, a large, modern building complex is illuminated with green lights. The city's skyline is filled with various skyscrapers and buildings, some of which are also lit up. The overall scene is a vibrant and modern urban landscape.

# UAE - CHALLENGES & OPPORTUNITIES

# UAE'S BUILT ENVIRONMENT -*Growing Economy: Growing Waste*

- Out of total solid wastes generated in the UAE, the construction and demolition wastes or (C&D wastes) account for 70% of the total weight of solid wastes
- Dubai alone produces nearly 5,000 tonnes of construction and demolition waste every day, which is about 70% of the total solid waste generated every day
- It is expected that construction and development activities and associated C&D waste production will continue to rise in this region

# CHALLENGES

- Not much diversification of the economy
- Consumerism based economy (for raw materials & products)
- Social stigma for a reusing culture
- Companies lack the processing capabilities to commit to reselling an already sold item
- After end of life waste not processed within the country (lack of transparency & control over the recycling industries)

Listed as having  
the **29th** highest  
carbon dioxide  
emissions

# THE UAE CIRCULAR ECONOMY PLAN

- **2019 – 360 Initiative** (in collaboration with World Economic Forum)
- **2021 – Circular economy principles**
- **75% landfill diversion target**
- **Generate \$4.5tn (AED16.5tn) in additional economic output by 2030**

- ❖ **Generating considerable economic proceeds for the country**
- ❖ **Mitigating environmental pressures**
- ❖ **Ensuring the supply of raw materials**
- ❖ **Increasing competitiveness**
- ❖ **Motivating innovation**
- ❖ **Strengthening economic growth**
- ❖ **Creating job opportunities.**

# CASE STUDIES



# Notre Dame Catholic College, Liverpool

- ❖ The school building has a simple shell in the form of a modern wide-span structure which was economic and quick to construct;
- ❖ All internal floors and partitions can be removed, leaving a fully stable clear span shed (80 x 56 x 12m high);
- ❖ The perimeter 'primary' accommodation provides traditional classroom spaces with good acoustic performance, natural light, and efficient heating and cooling;
- ❖ 'Secondary' inner accommodation provides flexible zones, including the introduction of modular teaching spaces which can be relocated or replaced as needed;
- ❖ The efficacy of the model was proven at the construction stage when an area designated as a 750m<sup>2</sup> doctors surgery was adapted to a music school with no impact on cost or programme.

**FARNEK**



# Olympic Stadium, London

- ❖ Designed to reduce seating from 80,000 for event to 55,000 in legacy mode with demountable seating to upper terrace;
- ❖ The lightest Olympic Stadium ever, with just over 10,000 tonnes of steel (perhaps four times less than many others of a similar size);
- ❖ Roof truss compression ring formed from unused gas pipe from a North Sea oil project from Kazakhstan;
- ❖ Approximately 40% of the concrete used was made of recycled aggregate;
- ❖ Many of the building products were transported using trains and barges rather than by lorry.



# Emirates Global Aluminum

- ❖ Finding a productive use for SPL (Spent Pot Lining)
- ❖ Usually this waste material is treated & when inert stored indefinitely with out any use
- ❖ EGA produces between 33,000 and 35,000 tonnes a year of SPL waste
- ❖ Since 2016 by repurposing it as a raw material for the cement industry.
- ❖ EGA supplied more SPL to UAE cement plants in 2018 than it produced – which means it is now progressively reducing its stockpile from earlier years
- ❖ In 2019, EGA recycled 28,000 tonnes of carbon dust by supplying it to the cement industry as an alternative fuel.





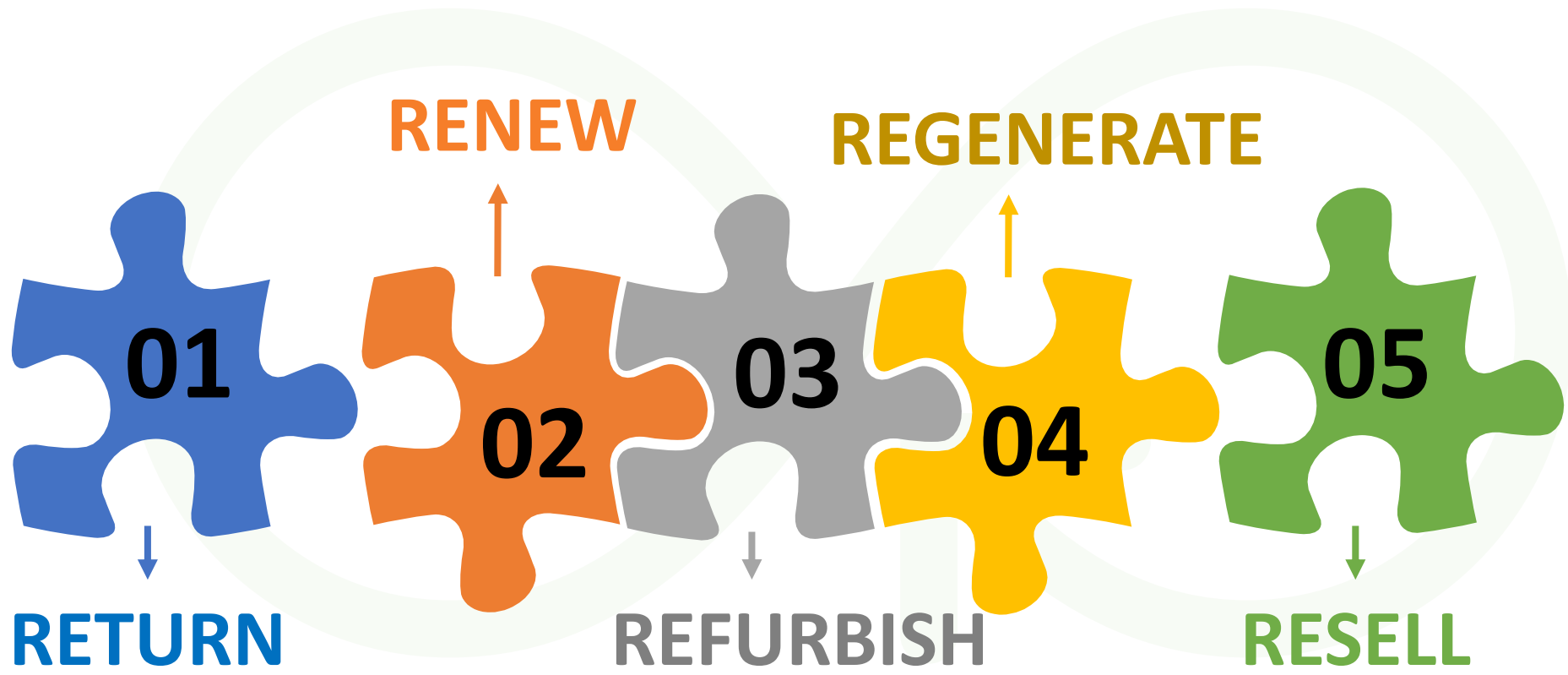
WAY FORWARD



# SO WHERE SHOULD WE FOCUS OUR EFFORTS

- Design future-proof buildings
- Design for climate adaptation and the impacts this will have on the buildings we are designing now (temperatures, flooding, air quality, plant requirements);
- Prioritize retrofitting/ refurbishment rather than demolition.
- Embrace new business models, from adaptable assets to enhancing residual spaces.
- Develop policies and strategies for mobility and transportation
- Ensure recycling procedures maintain the material value
- Implement performance procurement and product as service rather than buying products
- Work with the supply chain to integrate recycled materials in the construction of new buildings.
- Execute renewable energy initiatives.

# CHANGE OF APPROACH – on how waste is managed



# HOW CAN WE JOIN THE CIRCULAR WORLD?

## INDIVIDUALS


- Seek products and services that focus on product longevity, reuse and repurposing avoiding fast fashion, disposable products etc.
- Be waste conscious when purchasing

## BUSINESSES

- Design products that can be easily changed into something
- Purchase durable products
- Prefer low carbon products
- Plan reuse of materials when purchasing
- Buy a service than a product
- Repair & Resell

**THANK YOU**





Your partner for  
technology and sustainability-driven  
FM services.

Contact details:

Dubai, P.O. Box: 5423 DXB, Farnek Building, Floor 3, Al Quoz

Tel: +971 (04) 3824400, Fax: +971 (04) 3397456, Email: [info@farnek.com](mailto:info@farnek.com)

**FARNĒK**

FARNEK.COM  SMART AND GREEN FM COMPANY