# **MODULARITY FOR ENHANCING** EFFICIENCY AND ADAPTABILITY IN URBAN CIRCULAR ECONOMY

## Background



## **Resource and Environmental** Challenges

Urban areas with linear, unsustainable practices face challenges such as resource consumption and environmental impact.



**Adapts to Limited Space** 

Cities may have limited space, modular

buildings can easily adapt to any site.

Different layout and shapes.

Example: Carmel Place, New York

## Solution



## **Circular Urban Landscape**

As seen on the left, a circular urban landscape can be defined as an urban setting in which circular economy takes place—meaning resources are returned to the loop to minimize resource expense, waste and emission. The stakeholders are the government that provides regulations, planners who give innovation to begin this change, and private entities or civilians whose demands must be taken into account

## Modularity to Ensure Circularity

Efficiency conserves resources such as time, costs and materials, while adaptability increases a building's lifespan when the city changes. To do this, we can apply the concept of modularity from individual building constructions to urban development.

Jordan J Lewa **Elective Circular Urban Landscape** WS24/25 **RWTH Aachen** 

## **Improving Construction** Efficiency

Prefabricated modules cuts construction time, while standardized connections ensure rapid assembly and disassembly. Example: Modules of support structure



## **Flexible Assembly Parts**

Components can be arranged into various layouts to form each module or unit as needed. Multiple different configurations.



#### Image: My Micro NY

## **Modularity in Different Scales**



## **Improving Material Circularity**

A modular building enables recovery and reuse of its materials and components instead of demolition into rubble. Thus, when the building has served its purpose, it becomes a readily available resource for urban mining.



#### **Unlocks Infrastructure** Adaptability

They can scale up as the city expands in size and density or expanded to accommodate population increase and rising demands for jobs.



## Universal Standardization System

## The next step for modularity after prefabrication is standardization

Innovation: a single universal standardized system. It would be the pinnacle of modularity where all components are universally compatible.

Image: HA-HA modular design



## **Compatibility across any type** of building

different standards from all Existing manufacturers combine, so that all components make modules compatible with each other.

### **Unified catalogue**

BIM Support. All materials have digital passports, containing information from their origins to recylability. Also precisely defines each component, from connection types, electrical bus system, and dimensions. The catalogue also allows quick ID, selection and tracking.

#### Scenario:

A reclaimed glass door from a hospital will be repurposed to an office building, both using same connection type compatible to wall modules on old and new site.



Image: Contenedomus