

# EXPERIENCES OF CTCON IN SUSTAINABILITY

Learning Activity at UPCT



Co-funded by  
the European Union



BIM-LCA

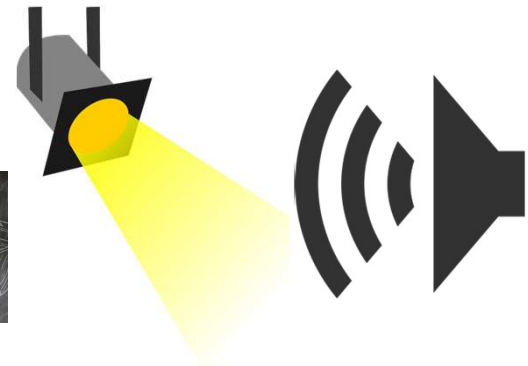
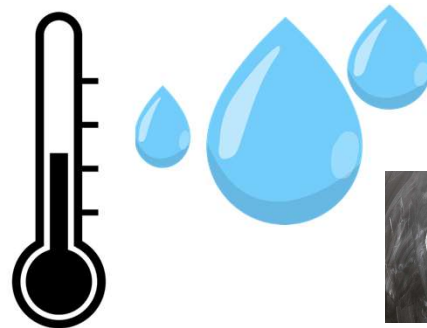
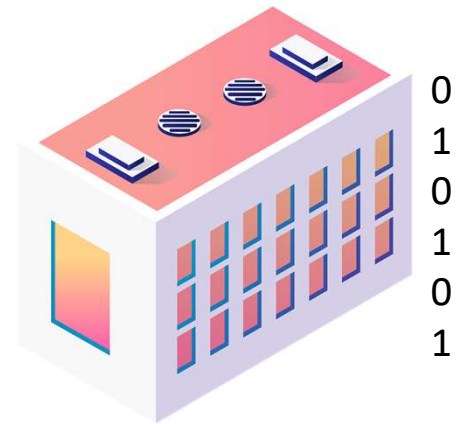
# SUSTAINABILITY → ECO-EFFICIENCY

- Environmental
  - Innovative and digital tools
  - Efficient & renewable energy
  - Materials
  - Constructive solutions
- Social
  - Sustainable Development Goals



# TOOLS

- Building Information Modeling
  - Digilab
- Life Cycle Assessment
  - BIM-LCA
- Monitorization
  - Temperature
  - Humidity
- Inspection with drones
  - Detection of thermal bridges...



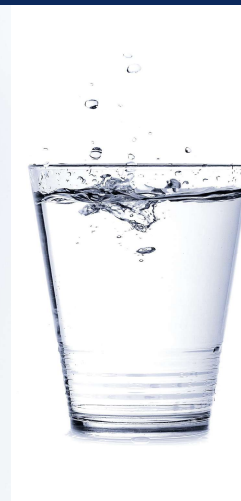
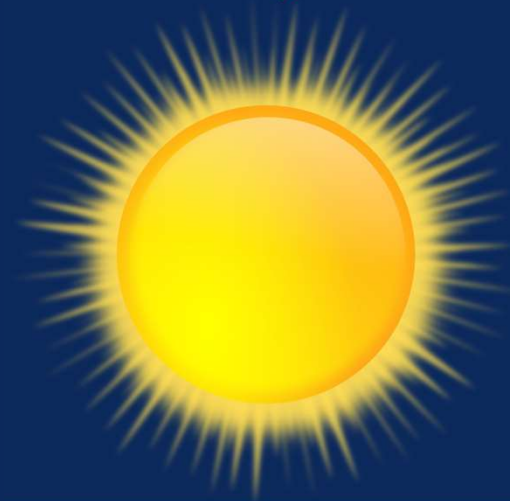
# ENERGY

## ➤ Efficiency

- Indirect climatization
  - Conditioned thermal chamber
  - High indoor thermal mass

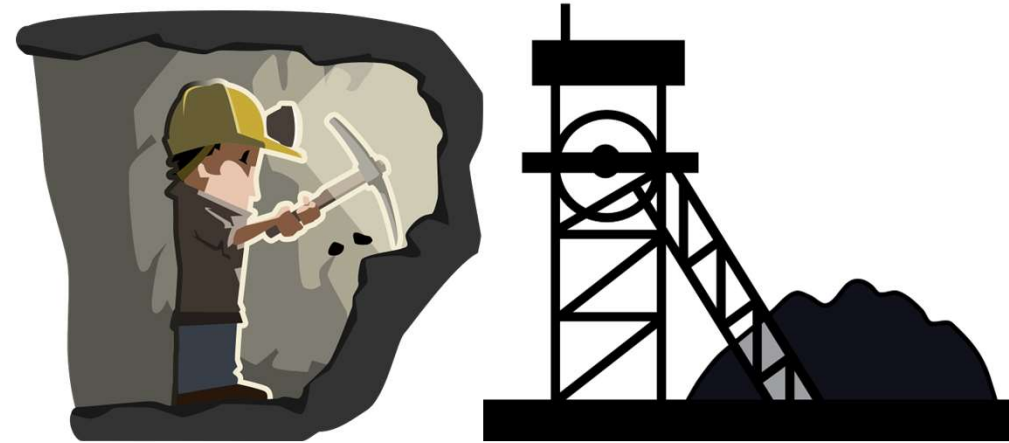
## ➤ Renewable sources

- Thermal and electric solar production
  - Integrated in buildings
- Phase change materials for storing
  - Day / night optimization



# MATERIALS

- Efficiency + Use of renewable energies
  - Extraction, manufacturing, transport, handling, maintenance
- Performance
- Durability
- Circularity
- Biobased / Renewable source
- CO<sub>2</sub> capture





# CO<sub>2</sub> CAPTURE

- Raw materials / Wastes
- Natural / Accelerated (previous capture into an equipment)

# PERFORMANCE

- Lightweight + Thermal insulation
  - Aerated concrete
- Urban heat island
  - Reflective pavement
  - Green walls on cementitious coating

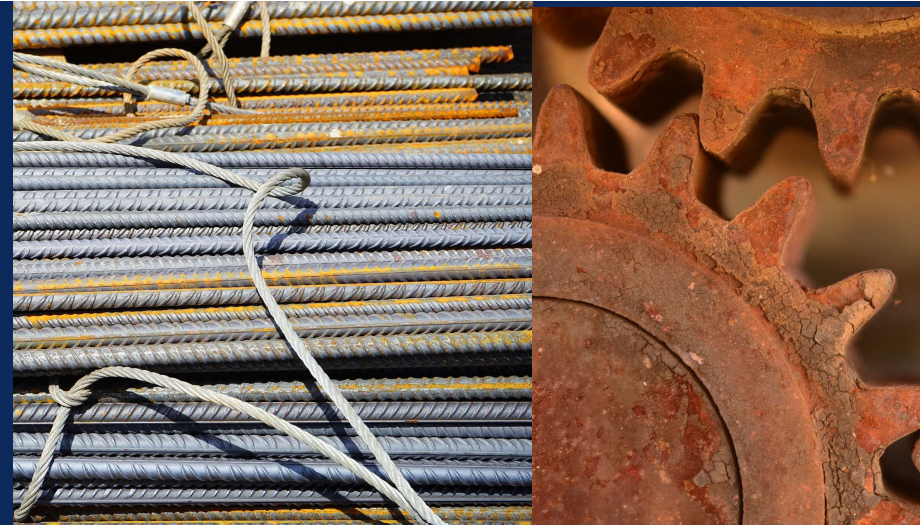


# DURABILITY

- Alternatives to steel rebars
  - Fiberglass, basalt...
  - Biobased resins
  - Textiles

# BIOBASED

- Oceanic Posidonia
  - In bituminous mixtures





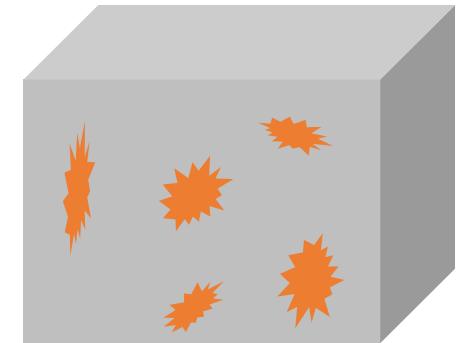
# CIRCULARITY

## ➤ Linear economy

- Reduction in resources availability
  - Prices instability
  - Dependency on others

## ➤ Circular economy

- Construction: Huge raw materials (40%) and energy consumer (35%) + CO<sub>2</sub> emitter (40%)
- Construction: Possibility of including wastes in some materials





# CIRCULARITY – CDW (40%/total)

➤ Downcycling – Filling material

Selective deconstruction  
Sorting  
Storage

➤ Upcycling

- Use as aggregate in non-structural precast elements
- Low requirements: dry consistency and low strength



CONCRETE



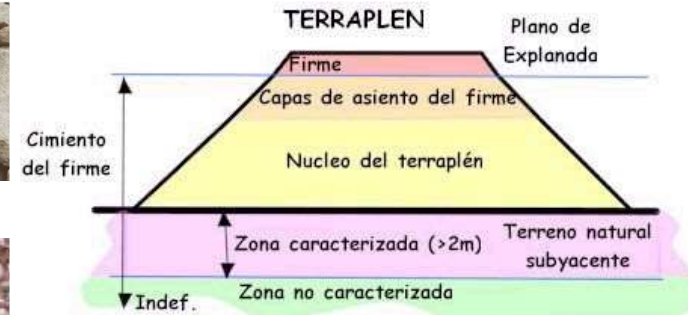
CERAMIC



MIXED



RAP



# INDUSTRIAL BY-PRODUCTS

- Recycled tyres
- Masks



# REPLACEMENT OF ORDINARY PORTLAND CEMENT

CO<sub>2</sub> 4-7% total world: Combustion + Decarbonization

- Supplementary cementitious materials
  - Biomass fly ash
- Alkali activated materials (geopolymers)
  - Ground granulated blast furnace slag

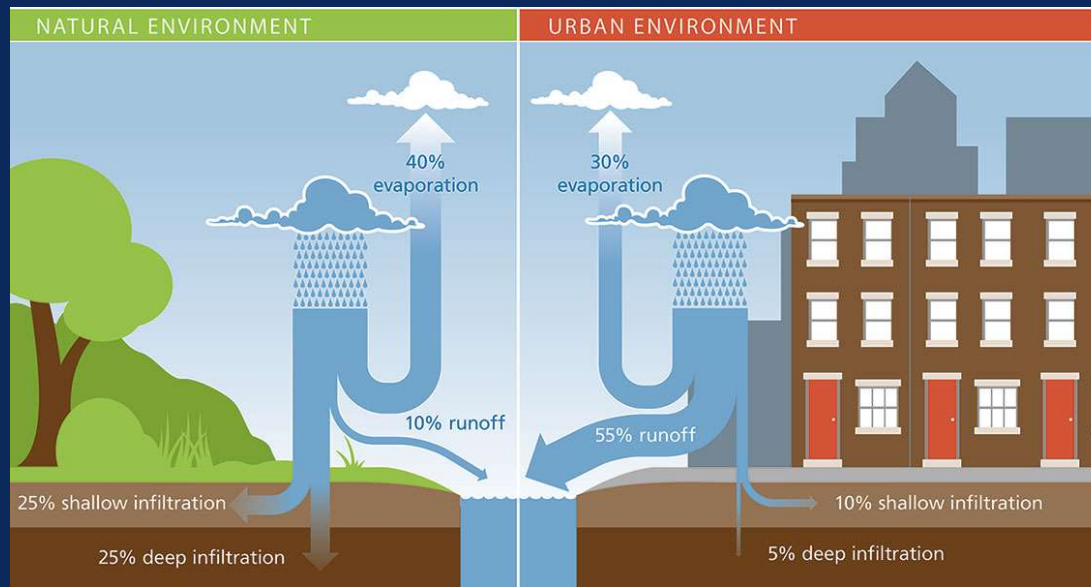




# CONSTRUCTIVE SOLUTIONS

## ➤ Sustainable urban drainage systems (SUDS)

- Promote rainwater filtration
- Climate change resilience







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