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## Project Partners



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Κυπριακή Δημοκρατία



Διαρθρωτικό Ταμείο  
της Ευρωπαϊκής Ένωσης στην Κύπρο



ΙΔΡΥΜΑ  
ΕΡΕΥΝΑΣ ΚΑΙ  
ΚΑΙΝΟΤΟΜΙΑΣ



## *Development of an Innovative Insulation Fire Resistant Façade from the Construction and Demolition Waste*

*DEFEAT Project's objective is the novel  
separation and transformation  
of Construction and Demolition Wastes (CDW)  
into an innovative insulation fire resistant façade.*

*Project Duration* 01/07/2020 – 01/08/2023

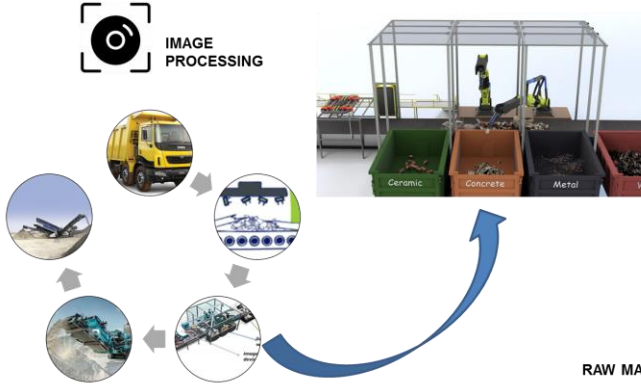
*Project Budget* EUR 1,098,880

*DEFEAT Project (INTEGRATED/0918/0052) is co-funded by the  
European Regional Development Fund and the Republic of Cyprus  
through the Research & Innovation Foundation.*

# DEFEAT Innovative Technology

## Image Processing and Neural Networks

The image processing is performed with Machine Learning techniques (such as Neural Networks), which will be trained on a set of images that will be annotated with the waste type in which they belong. The result will be a model that will be able to classify a given waste image to the type it belongs.



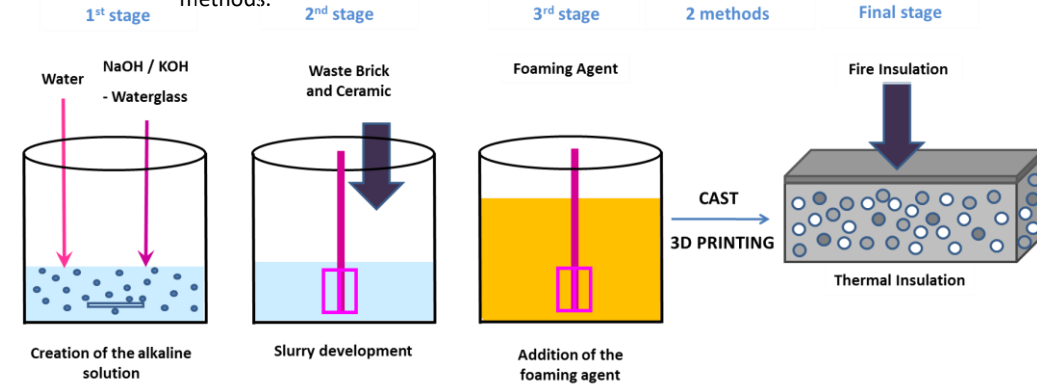
## Clean Material

Both Recycled Concrete Aggregates (RCA) and ceramics will be obtained. The former will be used for the production of concrete, whereas the latter will be used for the development of the new thermal and fire insulation composite material.



## Geopolymerisation

Low-cost innovative technology, with lower environmental footprint than cement industry. Both the thermal insulation and the fire resistant materials will be produced through the geopolymer technology. Optimization of the material density for thermal insulation will be achieved by chemical and mechanical methods.



## 3D Printing

Production by precast method and 3D-printing, a novel method that offers faster and easier production and less waste generation.

## Final Product

Development of the thermal insulation and fire-resistant composite façade, that will be able to be applied either on new or existing buildings.

## DEFEAT Impact

### Social Impact

- Enhance the **state-of-the-art knowledge concerning the reuse of CDW** in construction industry through the **production of innovative materials**.
- **Boost the recycling process in Cyprus** with all possible benefits and impacts.
- Utilization of CDW and return to the production cycle as a high value added material in the context of the **Circular Economy**.
- Developing **products that have an impact on the building sector**.

### Economic Impact

- **Stimulate the economy** by introducing new materials that **increase competition**.
- Developing innovative materials by **leveraging a number of companies**, creating growth conditions for the economy.
- Creating **Net Added Value** by investing and launching a high value-added product line and creation of a **suitable environment** for the further **development of innovative geopolymers materials in Cyprus**.

### Scientific Impact

- Developing and transferring of **know-how** to the industrial level in the recovery of CDW through the **development of a special type of composite material**.
- **Training of scientists and staff** in an interdisciplinary environment related to materials engineering.
- **First time in Cyprus and in Europe**, where inorganic polymers for **insulation and fire resistance from CDW** will be developed.

### Environmental Impact

- **Low energy consumption** for the development of geopolymers.
- **Low energy consumption** for the waste separation.
- **Reduced CO<sub>2</sub> emissions** compared to cement and concrete industry.
- **Decrease of a waste** with a simultaneous **positive impact on the environmental footprint** created by the deposition so far.