DEFEAT

<u>**De</u>**velopment of an Innovative Insulation <u>**F**</u>ire Resistant Façade from the Construction and D<u>e</u>molition W<u>a</u>s<u>t</u>e</u>



DEFEAT 1ST Issue: FEBRUARY 2021

The general objective of the DEFEAT project is the novel separation and transformation of Construction and Demolition Wastes (CDW) into an innovative insulation fire resistant façade.

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











Welcome to the **1st newsletter** from the DEFEAT Project. Stay tuned to be informed with the latest news and innovative developments from the DEFEAT Project which will be released through the newsletters twice per year.

In the 1st newsletter you can find an introduction to the project, briefly explaining the solution, problem, impact, work structure, latest activities, and consortium Partners.

DEFEAT at a glance!

The Problem

CONSTRUCTION & DEMOLITION WASTES



ENERGY SAVING



63% of total household energy is attributed to building requirements for heating, cooling and ventilation due to unsatisfactory thermal insulation



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Fire incidents in Europe (x1000)

EXISTING PRACTICES

- Cannot resist fire and high temperature (organic materials)
- Undergo spalling phenomena in case of fire incident (cement based materials)
- High cost materials
- High environmental impact

The Solution

The DEFEAT project tackles the above mentioned barriers by developing in a pilot scale, and through detailed experimental study, an innovative separation method of CDW, as well as a composite material generated also from the CDW, which will gain low thermal conductivity, satisfactory mechanical properties, and at the same time will be fire resistant. The produced material will be able to be applied as a façade, either on existing or new construction projects. For the development of the DEFEAT materials, the technology of geopolymerisation will be applied.





For the implementation of the proposed work, initially, a **novel method will be utilized for the optimization of the separation of the CDW**, in order to receive "Clean" materials after the CDW collection. On this purpose, the technology of **image processing** will be applied, to optimize the separation process. The waste concrete and ceramics derived from the CDW separation will be **fully characterized 'in-lab'**.

Both a **prototype**, as well as **large-scale boards**, that will combine fire resistance and thermal insulation properties, will be **designed**, **manufactured and tested**.

The manufacturing of the DEFEAT boards will be held by both a **conventional casting method** and by **3D printing techniques**, as well. Finally, an attempt will be carried out in order to establish a **framework for utilizing CDW as a raw material in the building industry**.



The Work Structure



<u> The Impact – Added value</u>

DEFEAT

Social Impact

• Enhance the state-ofthe-art knowledge concerning the reuse of CDW in construction industry through the effective utilization of CDW for the production of innovative materials

• Boost the recycling process in Cyprus with all possible benefits and impacts

• Utilization of waste 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 and benefits most of society

Economic Impact

• Stimulate the economy by introducing new materials in the building sector that increase competition and lead to lower prices

• Developing innovative materials by **leveraging a number of companies** wishing to mass-produce and sell them, creating growth conditions for the economy

• Creating Net Added Value by investing and launching a high valueadded product line and creation of a suitable environment for the further development of innovative building materials (geopolymers) by companies in Cyprus

Scientific Impact

• Developing of knowhow and transferring it to the industrial level in the recovery of construction waste materials through the production of recycled aggregates and development of composite fire resistant insulation material as well as on the waste separation

• Training of scientists and staff in an interdisciplinary environment related to materials engineering

• It will be the 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, since the curing temperature is ambient

• Low energy consumption for the waste separation

• Reduced CO₂ emissions compared to the cement and concrete industry

• Decrease of a waste with a simultaneous positive impact on the environmental footprint created by the deposition so far

The Partners

Frederick Research Center

Project management / material development and image processing **Development of guidelines for Action Plan**

University of Cyprus

Characterization of the raw materials and evaluation of the developed materials POLICY FORMULATION

EUVEN

NOUSTRY

Netiatis & Sons

RECS

Stratagem

INNOVATION DEMA

Katholieke University of

Leuven Design of the fire resistant and insulation materials

Department of Environment (DoE)

Adopt and promote the innovative prospect for this kind of wastes, thus mitigating the current problem

Public Works Department (PWD)

Make the first steps for pilot applications of the produced material in public projects

Public Entities (PWD, DoE) Work to change of the existing policies for utilizing CDW as raw GOVERNME

materials in the construction

COMMITMENT

Netiatis and Sons

CDW collection, separation, and image processing application

Latomia Pharmakas

Production of the innovative materials.

RECS Engineering

Design of the fire resistant and insulation materials

R&D INNOVATION

Stratagem Energy Ltd

Dissemination, exploitation, market and business related activities

Federation of the Building Contractors Association of Cyprus (OSEOK)

The main producers of CDW and at the same time, the biggest potential fosterers of new innovative developed material

Manufacturing of the demo wall and pilot application of DEFEAT boards

Use DEFEAT product in new projects

The Activities

Kick of meeting

The project's <u>kick off meeting</u> was hosted virtually by the project's Coordinator, Frederick Research Center, on the 1st of July.





Project Webpage and Social Media Platforms

The DEFEAT website and social media platforms have been set up and are daily informed with the Project's progress by the Project's Innovation Manager Partner, STRATAGEM.

http://defeat.frederick.ac.cy/

Project video

Technical Project Manager, RECS Civil Engineers & Partners LLC, develop the teaser video of the DEFEAT project to present briefly the mission of the project

https://www.youtube.com/watch?v=wL BsuwBCoDY&t=1s



