

Challenges in implementing **Energy Geostructures** in developing markets: Evidence from Romania

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**EXPERT
PROJECT**

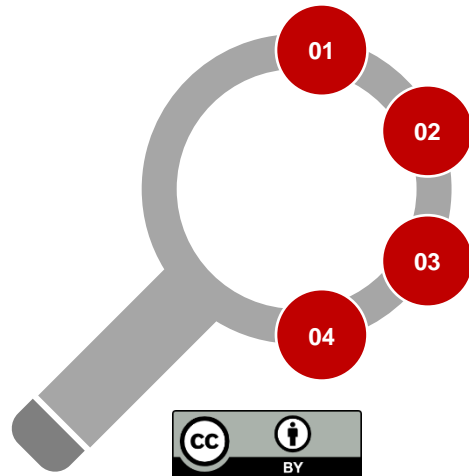




Energy Geostructures implementations in developing markets

- Following the Directive 2010/31/EU on energy performance of buildings, EU state members have developed national plans for increasing the number of nearly zero energy buildings.
- Different policies that facilitate the implementation of renewable energy technologies at the level of ALL countries.
- Energy geostructures are showing an increasing trend in number of implementations all across Europe.
- However, especially in developing markets where energy geostructures systems are still “at the beginning”, successful implementation of these structures is an **actual challenge for many reasons.**





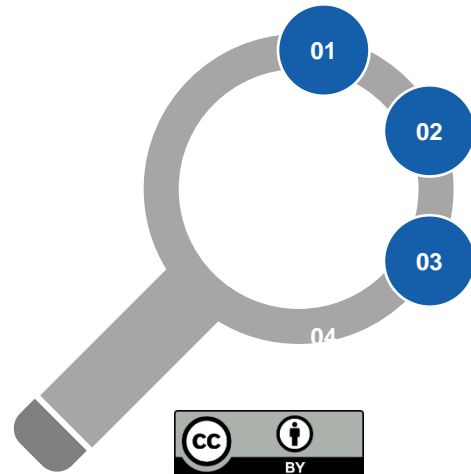
1
Site Investigation
Difficulties in having proper thermal investigation of the site

2
Design Step
Difficulties in having good data base for input parameters needed for the design

3
Implementation
Interconnection on site with different teams with different specialties that interact at one point in the execution with the energy geostructure

4
Quality work control
Difficulties in ensuring quality control of the materials, joints and work performed on the en.geo system at different stages of the construction.

Technical Challenges



1

Lack of return of investment available data with consideration of different factors and types of energy geostructures

2

Difficulties in ensuring the clients of the energy performance success because of many existing Unsuccessful Classical Systems (GSHP)

3

Budget difficulties for implementation of energy geostructures if the possibility of implementation is presented after the finalization of architectural concept

Economical Challenges

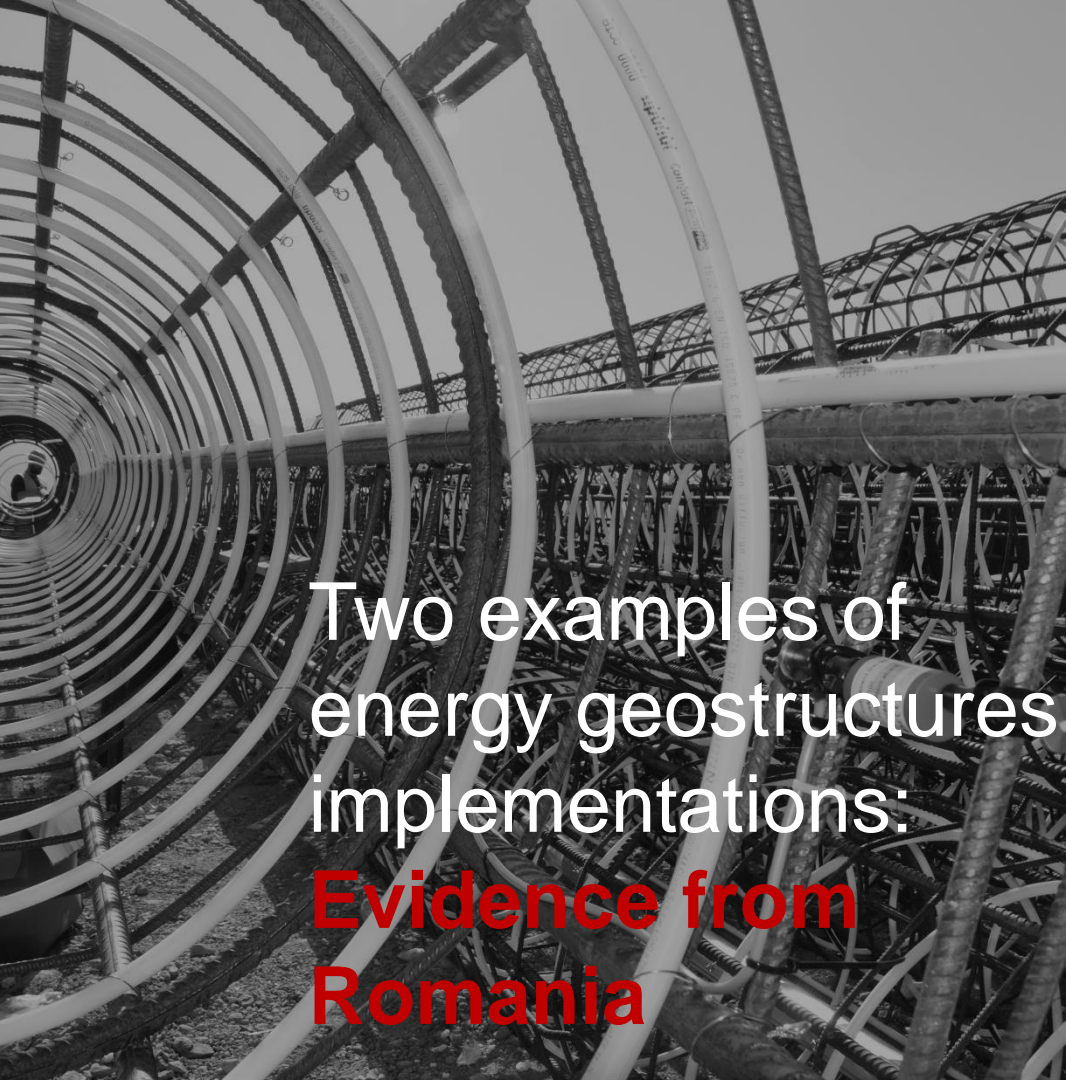
Multidisciplinarity and interconnections at all design and implementation phases



All the mentioned economical and technical challenges



Have direct consequences in the success of energy geostructures implementations and contribute in a negative way to the European objectives related to CO2 emission reductions and Renewable Energies Implementations



Two examples of
energy geostructures
implementations:

**Evidence from
Romania**



A New Emergency Hospital Unit

Location: Oradea City, Romania

The construction of the new building of the hospital started in 2019.

Foundation system is represented by isolated raft foundations on energy piles having in total a number of 230 energy piles, length 11m, diameter 600mm.

Energy performance: energy piles designed to cover 70% of the total demand for cooling and heating of the building.

* 8 piles were equipped with monitoring systems for energy and thermo-mechanical monitoring



Implementation phase:



3 New Residential Buildings on a steep slope

Location: Cluj-Napoca City,
Romania

The construction of the 3 new buildings needed a stability structure on the site in order to ensure its slope stability. Retaining wall of energy piles was designed and implemented, Piles characteristics: 1000 mm diameter, 22 m length.

Energy performance: the energy piles of the retaining walls designed to cover 100% of the cooling and heating demand of the three buildings

* 4 piles were equipped with monitoring systems for energy and thermo-mechanical monitoring



Implementation phase:



Discussion on possible solutions to tackle the existing challenges



European Standardisation + Guidelines

Will solve most of the problems related to the technical challenges



More Available Economical Data

Will facilitate the choice of the system as and efficient renewable energy system



Promotion of the technology among specialists involved in the construction sector

Increase the knowledge among the people that will interact with the project at any step of its construction from concept to actual monitoring.



Final Thoughts

It is important that besides “good statistics”, the quality and efficiency of what is implemented to be ensured so that a real change is generated in terms of renewable energy exploitation and CO2 emissions reduction.

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