

International Conference

GEO4CIVHIC

Most Easy, Efficient and Low Cost Geothermal Systems for Retrofitting Civil and Historical Buildings

15th November 2023



Grand Hotel Excelsior
Great Siege Road, La Valletta - Malta



the project

The **GEO4CIVHIC** project has developed several solutions for **surface geothermal energy** as part of the retrofit environment, adapted to the type of buildings, climate and the geological features of underground, geothermal system (drilling methodology, GSHE, grouting, etc.). Special attention has been devoted to civil and historical buildings with an array of 4 real demonstration facilities (1 civil and 3 historical) and 12 virtual demonstration facilities.

In fact, as its main goal, GEO4CIVHIC has developed and demonstrated the added value solutions of installing **more efficient ground source heat exchangers** using innovative compact drilling machines tailored for the built environment. The project also aimed to develop or adapt heat pumps and other hybrid solutions in combination with **renewable energy sources** for retrofits through a holistic engineering and control approach for improving the return of investments, reducing the break-even point of the intervention cost, enabling attractive conditions for the use of this **innovative and green technology**.

GEO4CIVHIC's main asset is its activities grounded on innovative solutions, investigated by an **international expert group of companies and research centres** in the framework of the project's consortium composed by 19 partners from 10 different countries (Italy, Spain, Ireland, Belgium, Germany, France, Romania, Greece, Malta and Switzerland).

two key pillars

- 1 Reduce cost, increase efficiency and ease of installation** of each of the main components of the value chain of the geothermal plant by developing:
A) technical innovations in drilling; B) borehole heat exchangers; C) heat pumps; D) controls integration of other hybrids.
- 2 Develop engineering and decision support tools** in a holistic approach to:
A) identify the most appropriate solutions; B) raising awareness; C) increasing credibility and supporting implementation.

In brief, the GEO4CIVHIC activities have been organised into three groups, named “**Blocks**”.

technical block

Technical Block, which addressed the technical innovations and solutions to be realised and demonstrated starting from the state of art and the specific needs of building retrofits. Innovations have been introduced in each component: Drilling Machines and Methodology, ground heat exchangers design and materials, compact and hybrid HPs for high and low temperature terminals. A Decision Support System (DSS) has delivered the most suitable technical solution allowing for the use of other renewable energy sources and optimization of the controls.

economic & market block

Economic & Market Block, which addressed the introduction of these technologies to the market. The broad consortium stakeholders including architects, drilling machine builders, drillers, heat pumps suppliers, engineers and academics specialised in shallow geothermal applications and HVAC systems, heat pumps will provide their expertise.

environmental & standardization block

Environmental & Standardization Block, which dealt with the legislative, environmental and European standard conditions, with the project innovations for which recommendations and modifications have been developed through experienced consortium partners members of standards organisations and geothermal associations.

methodology

The overall methodology of **GEO4CIVHIC** has followed a holistic approach with the activities grouped by type and organized in a logical sequence from research over innovation to demonstration and evaluation.

The activities have been subdivided in four phases. The communication, dissemination and exploitation activities were implemented in parallel over the four other phases.

First, the basis for driving these innovations and for monitoring the project progress and results were researched. The innovations were developed in the second phase.

Once the developments have been realized the project has moved into an extensive demonstration phase. In fact, field tests of the key innovations were followed in a third phase by pilot, full case demonstrations and virtual case studies.

Upon results evaluation, a solid consolidated basis has been built for market exploitation supported by relevant participated successful training events, workshops and dissemination activities.

target group

With its interdisciplinary approach, the International Conference targets **geologists, engineers, architects, energy managers** and practitioners in **modern and historical heritage, green building and construction chain-industry professionals** along with **building and city managers**, including UNESCO designated sites. These professionals and practitioners are asked to display new capacities and knowledge on how to master energy-environmental issues in the age of climatic change and emissions energy targets.

organisation committee

DIN L-ART HELWA

L. Mule' Stagno, M. Scarpa, D. Sferra

CNR-ISAC

A. Bernardi, G. Cadelano, A. Bortolin

UNESCO Regional Bureau for Science and Culture in Europe

F. Bampa

programme

Wednesday 15 November 2023

Connect online:

<https://us06web.zoom.us/j/83418863276?pwd=PbnPh9xUQI8aYlbgHeRMuQmFKdca65.1>

Meeting ID: 834 1886 3276

Passcode: 133201

09.00

Registration of participants

I Session: Introducing the concept

09.30

Welcome

Luciano Mule' Stagno, DIN L-ART HELWA,
Adriana Bernardi project coordinator
GEO4CIVHIC - Consiglio Nazionale delle
Ricerche -ISAC

09.45

Welcome by Malta Authorities

10.00

Welcome by European Project Officer

Thibaut Resimont (EU Commission)

10.20

**Overview on the Shallow Geothermal
market in Europe and its potential
opportunities**

Burkhard Sanner - UBEG DR ERICH MANDS
U MARC SAUER GBR

10.40

**The H2020 GEO4CIVHIC project: main
features**

Adriana Bernardi, Coordinator of
GEO4CIVHIC - Consiglio Nazionale delle
Ricerche - ISAC

11.00

Coffee break**II Session: Technological Innovation for Shallow Geothermal Systems**

11.30

Geothermal mapping and drilling maps

Antonio Galgaro - University of Padova-
Department of Geosciences, David
Bertermann – Friedrich-Alexander universitaet
Erlangen Nuernberg and Marco Belliardi -
Scuola universitaria professionale della
Svizzera italiana

11.45

**New solutions for heat exchangers and
installation methodologies**

Luc Pockelé- R.E.D. srl, Davide Righini -
Hydra srl and Arno Romanowski - Terra
infrastructure

12.00

**New solutions for heat pumps with
geothermal sources**

Fabio Poletto - Galletti BELGIUM & HIREF srl,
Sergio Bobbo and Laura Fedele Consiglio
Nazionale delle Ricerche - ITC

12.30

REAL CASE STUDIES

MSIDA BASTION HISTORIC GARDEN - La
Valletta, Malta

Luciano Mule' Stagno and Daniel Micallef -
DIN L-ART HELWA

RESIDENTIAL HOUSE IN BATTLE -

Mechelen, Belgium

Jacques Vercruyssen – Geo-Green, Luc

Pockelé and Giulia Mezzasalma - R.E.D. srl

ANGEL'S GATE - Ferrara, Italy

Francesca Bampa - Regional bureau for science and culture in Europe UNESCO and Luc Pockelé R.E.D. srl

HISTORICAL PRIVATE HOUSE - Greystones, Ireland

Riccardo Pasquali - Terra Geoserv Limited Ltd

13.30

Lunch buffet

14.30

Sizing GSHP and hybrid technologies for shallow geothermal design applied to real and virtual case studies

Michele de Carli - University of Padua, Department of Industrial Engineering

14.50

Innovative tools: Drillability App and Decision Support System (DSS) for shallow geothermal facilities

Giulia Mezzasalma and Silvia Contini – R.E.D. srl and Amaia Castelruiz – Tecnalía

III Session: Standards, Environmental impact, Exploitation and Market, and Future activities for Shallow geothermal systems

15.10

European Standards in civil & historical Buildings and environmental impact for the application of Shallow geothermal systems

Riccardo Pasquali - Terra Geoserv Limited and Arantza LÓPEZ- Tecnalía

15.30

Coffee break

16.00

Exploitation and European market opportunities

Dery Torres – Solintel M&P SL, Loredana Fodor – Pietre Edil Srl and Dimitrios Mendrinou - Centre for Renewable Energy Sources and Saving.

16.20

Dissemination activities to build the future of GEO4CIVHIC's impact: The European Center of Excellence (ECOEs) and Training Tools Support Package

Javier F. Urhuguia and Miguel Ángel Mateo Pla - Universitat Politecnica De Valencia and Doinița-Iuliana Cucuțeanu - Romanian Geoexchange Society

16.40

Question time and discussion

17.30

Closing remarks



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