DEMONSTRATION IN HISTORICAL BUILDINGS

Concrete proof of the ability to integrate geothermal power application in cultural sites by overcoming conservational constraints and barriers

HISTORICAL CASE STUDIES

Technical Museum of Zagreb
Croatia

Historical building
Bucharest, Romania

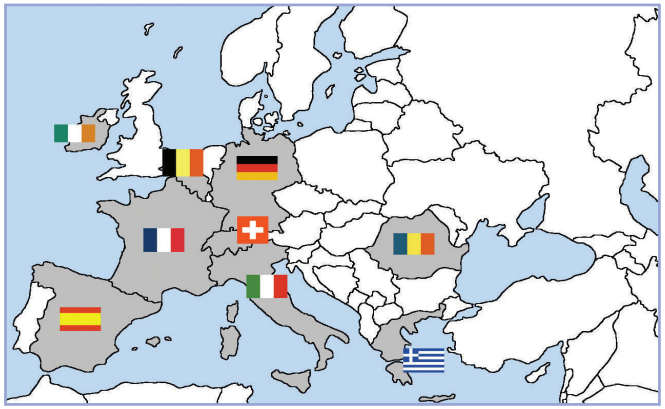
Ca' Rezzonico and Ca' Lupelli
Venice, Italy

Complex of Santa Croce
Florence, Italy

Belfield House at University College
Dublin, Ireland

The Serbian Orthodox Bođani Monastery
Bodjani, Serbia

PARTNERS



GEOEXCHANGE ROMANIAN GEOEXCHANGE SOCIETY

ISAC

aner sistemas informáticos

ITC

tecnalia

REHAU Unlimited Polymer Solutions

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

KAПE CRES

PIETRE EDIL

GEO GREEN

Red

University of Applied Sciences and Arts of Southern Switzerland

SUPSI

Galletti AIR CONDITIONING

FAU

SLR

HYDRA Hydraulic Tools

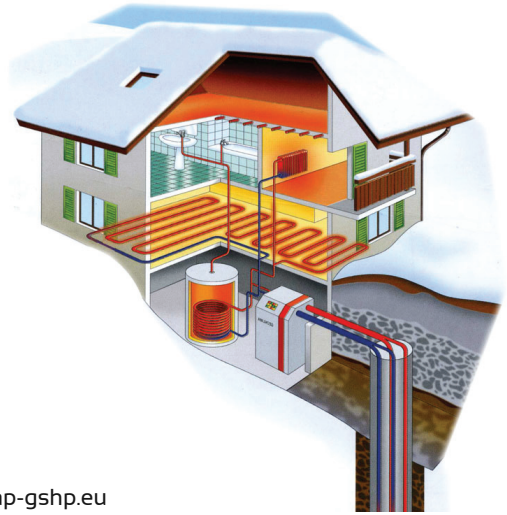
UNESCO United Nations Educational, Scientific and Cultural Organization — Regional Bureau for Science and Culture in Europe

Cheap GSHPs

2015

CHEAP AND EFFICIENT APPLICATION OF RELIABLE GROUND SOURCE HEAT EXCHANGERS AND PUMPS

Acronym	Cheap-GSHPs
Website	www.cheap-gshp.eu
Topic	LCE-03-2014
Type of action	IA
Call	H2020-LCE-2014-2
Start date	01/06/2015
Duration	48 months
Coordinator	CNR-ISAC
Contact	Adriana Bernardi a.bernardi@isac.cnr.it



www.cheap-gshp.eu

CHEAP-GSHPs project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 657982

PROJECT OBJECTIVES

The basic idea of Cheap-GSHPs project is to **substantially reduce the total cost of ownership,** composed out of investment and operating costs, **increase the safety of shallow geothermal systems** during installation and operation and **increase the awareness of this technology** throughout Europe.

To **reduce the total cost** of shallow geothermal systems **by 20-30 %**, the project will **improve actual drilling/installation technologies** and **designs of Ground Source Heat Exchangers** (GSHEs) in combination with a **holistic engineering approach** to optimize the entire systems for building and district heating and cooling applications across the different underground and climate conditions existing within the EU.

The **safety and regulatory aspects** will also be addressed **across all the components of the system** going from the geological aspects over the installation to the integration within historical, existing and new buildings.

The **developments** will be **demonstrated in six sites** whilst the **tools** will be applied **to several virtual demo cases**.

The project includes **comprehensive training manuals and courses**, **even specially devoted to the application to historical and cultural buildings,** in order to reach the different target groups and to lower the market entry threshold.

TECHNOLOGICAL DEVELOPMENTS

An existing, innovative **vertical borehole installation technology of coaxial steel GSHE** will be **improved** and a helix type GSHE will be developed next to a new, **innovative installation methodology**.

Drilling machine

These GSHE's will be installed to a depth of 40 – 50 meters, ensuring **improved safety and faster permitting**.

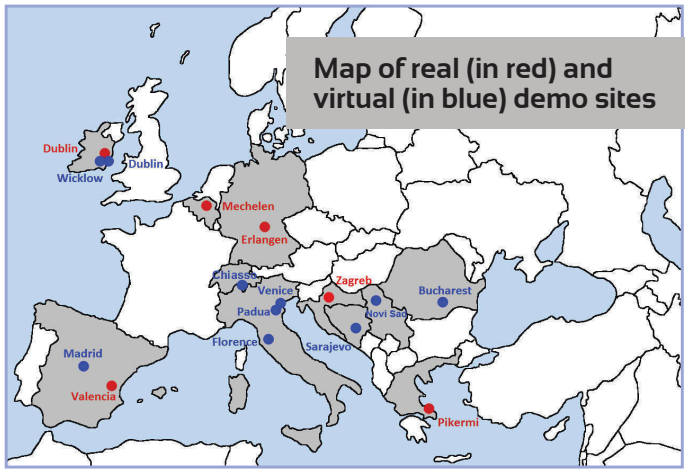
Also the use of **novel the heat pumps for higher temperatures** developed within the project will **reduce the costs in the market for retrofitting buildings.**

The project will also develop a **decision support system (DSS)** and other **design tools** covering: the **hydro-geological data** bases and analysis; the **feasibility and economic evaluation** of different plant set-ups; the **selection and design** of low enthalpy geothermal systems; the **plant configurations with other renewable energy sources.**

Helicoidal Ground Source Heat Exchangers

These tools will be made **publicly available on the web to users.**

DEMONSTRATION SITES



Map of real (in red) and virtual (in blue) demo sites

Real demo sites

1. **Belfield House at University College** Dublin, Ireland
2. **Residential ecohouse** Putte bij Mechelen, Belgium
3. **Universidad Politécnica de Valencia** Spain
4. **Test Site Erlangen** Erlangen-Eltersdorf, Germany
5. **Bioclimatic office building of CRES** Pikermi, Greece
6. **Technical Museum of Zagreb** Croatia

Virtual demo sites

1. **Ballyroan Library** Dublin, Ireland
2. **Residential Retrofit Glencree** Wicklow, Ireland
3. **Complex of Santa Croce** Florence, Italy
4. **Ca' Rezzonico and Ca' Lupelli** Venice, Italy
5. **Manens-Tifs S.p.A. Headquarter** Padua, Italy
6. **Grupo Ortiz Office Buildings** Vallecas – Madrid, Spain
7. **Historical building** Bucharest, Romania
8. **Historical Museum of Bosnia and Herzegovina** Sarajevo, Bosnia and Herzegovina
9. **The Serbian Orthodox Bođani Monastery** Bodjani, Serbia
10. **Office building of Brogeda-Chiasso** Switzerland