Workshop Geothermal panel meeting
8th September 2016
Brussels, September 8th, 2016

Cheap and efficient application of reliable Ground Source Heat exchangers and Pumps

Project number: 657982- Project duration: 4 years – Start 1 June 2015
Total project budget: 5.804,847,50 € - Project budget financed: 4.844.652,00 €

PROJECT PRESENTATION

Coordinator: ***Adriana Bernardi***
National Research Council (CNR)
Institute of Atmospheric Sciences and Climate (ISAC)

1. CONCEPT (1/2)

General objectives

- To **reduce total cost of ownership** of shallow geothermal systems by 25-30%
- To **increase** the deployment of this technology by 10% versus current estimates
- To **contribute to the environment** with an additional CO_2 emission reduction of 1800 T/y
- To **demonstrate the technologies in** civil and historical buildings (6 real sites and 10 virtual cases)

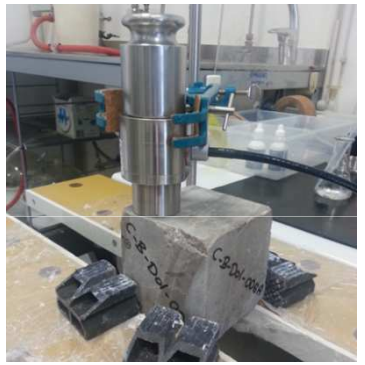
1. CONCEPT (2/2)

Project innovations

- **Thematic geothermal mapping at local scale** for better planning of geothermal systems
- **Drilling machine developments** combined with **new Ground Source Heat Exchanger (GSHE) designs** to improve installation techniques, increase yield, increase safety, reduce permit needs
- **Design software for GSHE and heat pumps and Decision Support System (DSS)** for optimum selection, design and implementation of complete systems across different applications and soil conditions
- **Novel heat pumps with improved performances at higher temperatures** to avoid having to change heating terminals in retrofitting of existing/historical buildings and to increase efficiency

2. RESULTS (1/4)

Work progresses



- **Pan- European Geological data-set with drillability information** realized
- **Structure and costs** of main types of GSHE's defined as reference basis
- **Heat basket developments achieved TRL 7**
  - ✓External diameter modification for more easy installation
  - ✓New drilling tool and installation method
  - ✓Two heat baskets installed in test field

2. RESULTS (2/4)

- **Co-axial GSHE developments** achieved **TRL 6**
  - ✓ New drilling head for **piling** manufactured
  - ✓ **Several** simulations on design innovations
  - ✓ Prototypes of new **inner tube** produced
  - ✓ Innovations implemented in the field at **full scale**

2. RESULTS (3/4)

- **Conceptual heat pump study** completed
- **DSS and Software design** of building blocks progressing well
- **Final selection of real and virtual demonstration sites** made
- **Pan-European legislative and regulatory analysis** completed

3. BARRIERS

- **Demonstration case in historical site** of balkans had to be changed due to unfavourable conditions to exploit shallow geothermal

- **Finacing missing infrastructure** like terminals and paying for operating costs (both not foreseen in Cheap-GSHPs budget) is under discussion in Eastern Europe

Technical Museum of Zagreb (Zagreb,Croatia)

Thank you for your attention!

www.cheap-gshp.eu

Contact:
Adriana Bernardi
CNR-ISAC
E-mail ***a.bernardi@isac.cnr.it***