REGEOCITIES, A EUROPEAN INITIATIVE FOR THE OVERCOMING OF THE REGULATIVE BARRIERS FOR SGE

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ABSTRACT

REGEOCITIES is an European project funded by the IEE Program (IEE-11-041) **focused** on the achievement of the NREAP geothermal targets 2020 marked by countries with ambitious objectives regarding **Shallow Geothermal Energy Systems by means of the removal and clarification of the non-technical administrative/ regulatory barriers at local and regional levels**. These barriers, not only from the point of view of the resources, but also from a point of view of administrations, buildings and thermal installations are being analysed in order to overcome the current situation, which is restricting the introduction of SGE as renewable systems for H&C buildings.

Furthermore, this project assesses current legal barriers of SGE in countries with different levels of implementation of the technology including mature and juvenile countries. **Engagement and commitment of Regional and local authorities** from those countries is successfully achieved in the project by the establishment of an advisory committee including actors and administrative organizations, as well as cities networks, which have already demonstrated interest in the implementation of the project results. Project outcomes will be implemented in order to achieve the objective of **developing a common European methodology for the regulation of the SGE systems in cities and regions**. The project, thus, is directly in concordance with the need arising from article 13 of the RES directive, calling for clear and fast administrative procedures.

1. INTRODUCTION

The objective of this communication is to present the project REGEOCITIES in order to introduce this initiative to the main European actors involved in SGE systems and make them participant of this initiative. The project is supported by the European program "Intelligent Energy Europe" and the consortium is formed by partners from 11 European countries where the shallow geothermal energy is contemplated as a resource for achieving the energy objectives of the Horizon 2020.

Building sector represents one of the most important energy consumers in Europe, in particular, for applications in heating and cooling (H&C) of buildings. In this context, Shallow Geothermal Energy (SGE), including Ground Source Heat Pumps (GSHP) and Underground Thermal Energy Storage (UTES, including ATES and BTES), represents a renewable energy source (RES) with a vast potential of energy savings (Lund et al. 2004; Sanner, 2003). However, SGE sector is nowadays tackling challenges related to regulatory barriers at different levels which are affecting the implementation of those systems in cities.

Project REGEOCITIES is focused on the achievement of the NREAP geothermal targets 2020 marked by countries with ambitious objectives regarding SGE systems (Beurskens and Hekkenberg, 2011) by means of the removal and clarification of the non-technical administrative/ regulatory barriers at local and regional level. Moreover, project results will be initially implemented in a series of endorsed cities and regions in order to promote the SGE and help to achieve the objectives marked in the SEAP documents of those cities. According to this objective, the main target group of the project is formed by decision makers at local and regional institutions, in charge of the regulation of the SGE systems.

The objective of the project will be, therefore, the creation of a "local and regional task force" with representation of cities and regions from the different countries participating in the project. The collaboration between selected cities and REGEOCITIES partners will trigger the constitution of their own pre-normative framework, adopting the recommendations compiled in the developed documents. The pre-normative framework for the local administrations and regions will be based on the documents of recommendations derived from project

activities, to be used as a powerful tool during the regulation of SGE systems. This framework will be based on the achievement of the following activities:

1. Description and analysis of the different scenarios of cities
2. Compilation of the in force normative that could affect the implementation of SGE
3. Identification of the main regulative barriers
4. Compilation of best practices and experiences from mature regions
5. Development of the common pre-normative framework
6. Implementation of training programs and help desks offices focused on the decision makers and the administration staff
7. Implementation of results in selected cities and development of regulation adopting the methodology

2. PARTICIPANT COUNTRIES, TARGET REGIONS AND KEY ACTORS

The project consortium is formed by 13 partners representing multidisciplinary organizations, which contribute to the project by means of the deep background in SGE, their previous experiences in other collaborate projects related to the geothermal energy and the capacity for carrying out the expected tasks of the project. REGEOCITIES partners are: AIDICO and UPVLC (Spain), RGS (Romania), EGEC and SPW (Belgium), SSSA (Italy), UBEG (Germany), IF (Netherland), SP (Sweden), GEUS (Denmark), BRGM (France), CRES (Greece), SLR (Ireland).

Furthermore, the participant organizations are located in 11 European countries, which have shown clear reference to the GSHP in their NREAP documents (fig. 1). The current situation in those countries with respect to the development and implementation level of the SGE is very variable. In this way, the countries or region could be organized as follow:

- Mature countries (Germany, France, Denmark, The Netherlands and Sweden): SGE technologies are well introduced in the markets and the public authorities have advanced protocols for the regulation procedure.
- Consolidated Countries (Ireland, Belgium and Italy): SGE technologies are known and a significant number of installations are running, nevertheless the regulative framework is not so specific as in the mature regions.
- **Juvenile Countries** (Spain, Romania and Greece): the introduction of the SGE systems is still poor, the regulative framework is scarce and unclear.

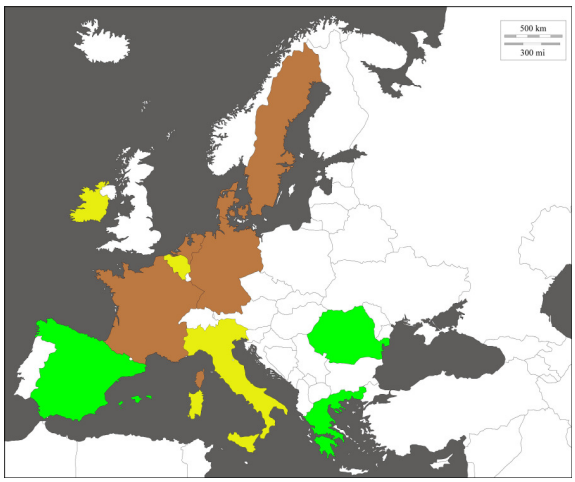

Figure 1: Europe map with the participating countries (Green-Juvenile SGE market; Yellow consolidated SGE market; Brown-Mature SGE market).

Key actors
The achieving of the expected objective depends strongly on the engagement of regional and local authorities from participant countries in association with market actors. Those actors will be the final beneficiaries of the project results and, subsequently, they should be involved in the development of the project with an active role. For this reason, it was decided to set up an advisory committee formed by representative personnel from the participant countries, who will be punctually informed about project results and development. In consequence, the key actors for this project were grouped as follow:

- European, national, regional and local decision makers : public administrations directly involved in the normalization process of buildings and SGE systems
  - from regions with experiences in GSHP
  - from municipalities and regions with a clear commitment for implementing the project results and grouped in an advisory committee.
- Companies and professionals of the SGE sector : drillers, heat pump producers, designers, engineers.
- Professionals from building sector : property developers, construction companies, designers.
- Energy services companies, consultancies and H&C companies which might be interested in incorporating SGE in their current business.

All those key actors will constitute a “local and regional task force” which will guarantee experiences exchanges and an efficient dissemination and implementation of the project results at different scales: participant countries, other European countries, regions, cities.

Moreover, the endorsement of cities and regions is crucial for the success of the project. In this way, different contacts with local administrations and

regions from the participating countries have been already established in order to create the core of the advisory committee. Cities and regions with predisposition for implementing the project results are presented in table 1.

Table 1: List of participant countries with the committed cities that have already shown a clear interest in the project.

Country and Partner	City or Region
Spain (AIDICO, UPV)	Region: Valencia region, City:, Valencia, Pobla de Vallbona
Romania (RGS)	Bucharest (including letter of support); Oradea
Belgium (EGEC, SPW)	Region: Flanders Region City: Heerlen (letter of support)
Italy (SSSA)	Tuscany Regional administration and Cosvig Ferrara region
Germany (UBEG)	Regions: Brandenburg, Hessen Cities: Wetzlar, Hamburg, Bonn, Frankfurt/Main, Köln
Netherland (IF)	Regions: Utrecht and Drenthe Heerlen municipality
Sweden (SP)	Cities of Stockholm and Malmo
Denmark (GEUS)	Member organisation for the Danish Municipalities Odense Kommune, Skanderborg kommune
France (BRGM)	Region Centre City: Orleans
Greece (CRES)	Region: Attica City:Pefki
Ireland (SLR)	Cities: Dublin and Cork

3. PROJECT OBJECTIVES AND WORKING PLAN

The Project REGEOCITIES aims to remove legal barriers and stimulate SGE solutions by helping local authorities of european countries to constitute regulative framework according to good practices identified in participant countries at different scales (local to national). In this context, it is pretended to overcome the current challenges and achieve several objectives. Those objectives are classified as specific or short term objectives (achievement during the duration of the Project) and strategic or long term objectives(achievement until 2020).

- **Specific objectives :**

o Elaborate a set of **documents presenting the current situation** for SGE in participant countries (market conditions, current regulative framework, main barriers, good practices) and an **analysis of the best practices identified in mature areas and containing recommendations for regulation and policy** that could be transferred to juvenile regions.

o Develop a **common methodology for regulating the implementation of SGE systems** in European countries, regions and cities based on the previous recommendations. This methodology will concern new buildings in cities, refurbishment of buildings and district versus individual systems and it is expected to be tested in participant regions/cities.

o Develop **support measures** for the GSHP market including the design and development of a common statistic system for compiling all the SGE systems installed in Europe in order to analyze the real potential of these systems as renewable energy systems (RES), as well as to monitor the implementation of NREAPs in GSHP domain. This common database could be used to collect technical information about all the regulated GSHP installations in participant regions and to permit their mapping. It is pretended that the involved cities include the database into their own regulative process.

o Set up a complete **training program** for local authorities (energy managers of municipalities and regions) for providing support to the implementation of the common methodology and transfer best practices and solutions identified in other countries/regions/cities. This objective will be achieved by means of preparation of training supports (one basic course for understanding of the geothermal systems, one specific course about technical procedures, one specific course about administrative procedures) and the realization of 3 one-day courses per participant country**.**

o Disseminate the project outcomes to convince local policy makers for supporting the development of SGE systems, to determinate the social acceptance and knowledge of this energy solution and to enhance the current situation of the SGE systems, in participant

countries and in other European countries by means of **Dissemination and Communication Plan** including:

- Development of **market studies in the regions to analyse the degree of acceptance of the geothermal systems** by the general public.

- Creation of a **website :** http://regeocities.eu/. It provides documents for download, such as project brochures, presentations given at project seminars and workshops, all deliverables and other documents produced in the course of the project

- Participation and organization of **workshops** to introduce the SGE to the stakeholders.

- Launch a **promotional campaign** for the dissemination of results: Papers, Posters participation to information, training and dissemination events.

- **Strategic objectives:** contribute to the achievement of the European's 2020 targets on energy efficiency and renewable energy sources

o Develop the use of the **common methodology** developed in the project for regulating the implementation of SGE systems at **European scale.**

o **Develop local competencies on SGE** systems with the help of the training program defined during the project.

o **Increase and enhance the GSHP market in the European regions** by the elimination of current regulative barriers and the dissemination of SGE systems to European key actors.

o **Integrate the SGE technologies into the SMART CITIES concept** in order to obtain implementation of sustainable and high efficient systems into public and singular buildings.

After the end of REGEOCITIES project, several activities will be performed in order to assure the achievement of the strategic objectives: maintenance of the dissemination activities by the partners (active **participation in the European forums of RES and sustainable buildings** as well as congresses and conventions focused on application of RES to the building sector). Preparation of workshops and specific courses could be also possible after the project life, especially in other European regions where the project results could be transferred in order to spread out the potential markets of the GSHP.

The working scheme that has been designed and is currently carried out for achieving the highlighted objectives is shown in fig 2.

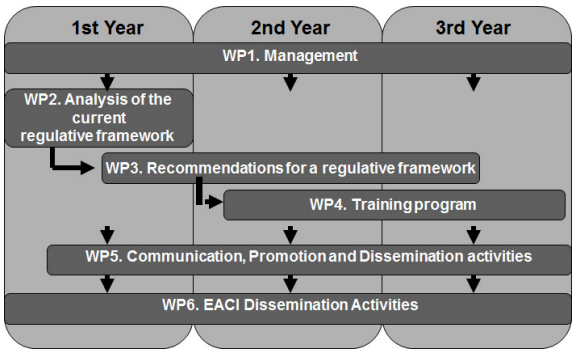

Figure 2: Working plan of the project REGEOCITIES.

The WP1 deals with the management and coordination of the project including as main activity the organization of the advisory committee. The objective of the WP2 is to identify and analyse the current in force regulative framework and administrative procedures with a direct impact on the incorporation of SGE for H&C in cities. Outcomes and results of the analysis performed in the different regions will be, afterwards, used for establishing a document of recommendations for a European common methodology, which will lately be the base for a pre normative framework at local level. WP2 will analyse not only the regulative situation of the targeted regions but also will incorporate the outcomes from previous IEE projects such as GTR-H, which were performed in other regions and focused in concrete barriers. The participation of partners from all the countries and regions involved in the project will be required in order to compile the level of regulation in the different countries. It will be usable for understanding the current regulative European situation and the main differences between mature and juvenile regions.

Work package 3, Recommendations for a regulatory framework, is focused on the development of a document with recommendations which can be lately use for the implementation of common regulative solutions for the targeted regions in order to ensure more flexible regulative processes. The recommendation document will be based on the analysis of the current regulative framework, the results from previous projects with positive outcomes (GTR-H), and the identification and exchange of positive experiences from mature to emerging markets in order to avoid the initial regulative barriers of those systems which have been already solved in the mature regions. Outcomes and results of this WP are directed to the target group formed by local administrations and regional authorities, which will be in fact responsible of the development of the regulatory framework based on the recommendation document. Furthermore, it is intended to define the specific aspects which should be considered according to the different scenarios defined in the cities. Main scenarios will be defined according to the use of the soil such as consolidated urban areas, expansion areas, historical centres, etc. In those areas,

it will be necessary to establish the soil availability as well as determinate the compatibility of the installation of boreholes for the geothermal exchange with any other type of underground infrastructure

WP 4 is designed as a fundamental step towards the removal of most of the regulative barriers faced by SGE systems, a proper understanding of this source of energy and the efficient transmission of the practical knowledge and acquired experience. A training program focused on the key personnel responsible for the management and development of SGE projects at the level of municipalities will be developed and implemented. The training action involves the necessary amount of key actors to ensure a European-wide impact on the perception, attitude and technical skills of the targeted personnel.

Finally, WP 5 is focused on the dissemination of the REGEOCITIES results at national and European levels all over the EU to improve the use of SGE systems for heating and cooling in the European building sector. In addition, networking activities will foster exchange with other related projects and explore potentials for synergies. The activities foreseen in this Work Package will be planned and gathered in a Dissemination and Communication Plan (DC Plan) and will reach the potential stakeholders, mainly construction companies, consultants, installers, architects and builders, also to the general public.

5. EXPECTED QUANTIFIED IMPACTS

Two different assumptions were considered for calculating the expected impacts: the NREAP objectives marked for the Horizon 2020, and the currently recognised European average installation: SGE with a capacity of 11 kWth, running 2200 hours/year, so produces 24,2 MWh or 2,1 toe (in accordance to the rules set forth in annex VII of Directive 2009/28/EC).

Furthermore, during the calculation and estimation of the indicators, it was considered that the individualized impact that the REGEOCITIES project could have for contributing to the EU 2020 targets was difficult to valuate in a direct way, without considering the effect of other initiatives and the common objectives marked by the European agreements. For this reason, the possible impacts that the project could trigger in the 11 participant countries were evaluated and estimated taking into account the objectives marked in the 2020 Agenda and the current actions for promoting and overcoming the current barriers of the SGE that are being carried out in the European framework. Considering all those premises, the impacts that could be achieved with this project are shown in table 2.

Table 2: Expected impacts of the project during next years

Specific and strategic objective	Target within the action duration :	Target by 2020:
Contribution to the EU 2020 targets on energy efficiency and renewable energy sources	▪ 3500 to 3750 Millions of € Cumulative investment made by European stakeholders in sustainable energy (incl. end users / consumers)	▪ 15 Bio € Cumulative investment made by European stakeholders in sustainable energy (incl. end users / consumers)
	▪ 480,000 to 525,000 Renewable Energy production triggered (toe/year)	▪ 2,100,000 Renewable Energy production triggered (toe/year)
	▪ 144,000 to 157,000 Primary energy savings compared to projections (toe/year)	▪ 630,000 Primary energy savings compared to projections (toe/year)
	▪ 558,240 to 610,575 Reduction of greenhouse gas emissions (t CO_2e/year)	▪ 2,442,300 Reduction of greenhouse gas emissions (t CO_2e/year)

The impacts and outputs of the REGEOCITIES project could be related to the expected impacts especially in those countries with direct participation in the project. As it was established, the project will have a strong impact in the 10-15 committed cities where the number of SGE systems implemented during the project and after the project will be significant thanks to the clarification of the regulative framework, the training of the personnel and the promotion of this solution in the juvenile regions, where the potential market for the SGE is very important.

Furthermore, thanks to the activities for disseminate the project and the work performed in the framework of the Covenant of Mayors; the impacts and outputs of the project in many regions and cities will be moderate, triggering a growing interest in the solutions associated to the SGE systems in those cities and subsequently an increment in the market of SGE.

In the project, it is pretended that at least 50-70 cities refer the SGE in their own SEAP documents in order to be considered as a solution for the achievement of the objectives of the Horizon 2020.

Finally, the training programs including the formation of technical personnel from the administration, the development of tools for facilitating the implementation of helpdesks in the cities, the promotion of the technology and the dissemination of the project will, presumably, facilitate the development of the SGE market in the juvenile regions and the consolidation of the markets in the mature regions. Considering the progresses achieved during the project development and the different actions that other projects are bringing to the sector, it could be concluded that the ambitious objectives marked in the Horizon 2020 will be achieved and the energy savings in the H&C of buildings will be obtained by means of more efficient and renewable technologies.

6. CONCLUSIONS

REGEOCITIES project is a European initiative with a high potential for overcoming the current situation respect to the regulative framework. With this initiative, it is pretended to create a common pre-normative framework for harmonizing the protocols and based on best practices. The initiative could trigger an enhancing of the current situation helping to achieve the marked objectives that the European countries have described in the NREAP. The project began during 2013 and the duration is 3 year. The current preformed work allowed exchanging experiences between the partners about the level of development for SGE sector and the associated regulative framework in each country. The preliminary results from the project are compiled in a series of national reports that have shown a significant disparity in the regulative framework. Currently, the consortium is written a general report of the overall situation in Europe based on the different national reports

The general analysis is currently permitting to identify best practices that could be recommended at European level. The web site useful for sharing the project's results is operational under the domain: www.regeocities.eu. A basic structure for a common European database relative to SGE installations is in elaboration. The current progress of the project does not still allow to present accomplished results, but the relations between key actors are established, a common language has been established, the exchanges work began and, already, positive experiences are noticed (management tools of the resources and the uses existing in Stockholm as a positive example of good practices for illustrating the possibilities in other committed cities and regions).

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