

European Technology and Innovation Platform on Renewable Heating and Cooling

Brussels, 8 September 2016 – GT panel Meeting
Feedback from ongoing R&D projects



Deliverable 1.1- First report on the status of the implementation of the five Roadmaps

- Status of Implementation of the Geothermal Technology Roadmap (EGEC)
- The projects which are the focus of the analysis should start from 2012 and already provide main results in 2016.
- The geographical coverage is EU-28+Iceland, Israel, Norway, Switzerland, Turkey). Both EU and national-funded projects should be the focus of our analysis.

R&I priority: SHALLOW GEOTHERMAL- GROUND COUPLING TECHNOLOGY

AREAS- *Improved vertical borehole drilling technologies to enhance safety and reduce cost of BHE installations - Improved installation technologies and geometries for ground Heat Exchange technology (GEO S 1)*

Specific KPI	Value of the KPI at the date of submission of deliverable D1.1	Statements and figures supporting the value provided
A further decrease in energy input and reduced costs for operating the geothermal heat pump system	2 projects have just started in 2015, no results yet	Cheap-GSHPs - Cheap and efficient application of reliable ground source heat exchangers and pumps GEOTeCH: Geothermal Technology for Economic Cooling and Heating

R&I priority: SHALLOW GEOTHERMAL- GROUND COUPLING TECHNOLOGY

AREAS- *European-wide Geoactive Structures Alliance. Development of a network of laboratories to create 4 testing sites. (GEO S 2)*

Specific KPI	Value of the KPI at the date of submission of deliverable D1.1	Statements and figures supporting the value provided
A Seasonal Performance Factor in the order of 5 for 2020	COST action started in 2015, well tailored to the priority; no results yet	COST-Action GABI - Geothermal energy Applications in Buildings and Infrastructure http://www.foundationgeotherm.org/
A Hellström-efficiency (a measure of the impact of borehole thermal resistance) of about 80% in 2020	COST action started in 2015, well tailored to the priority; no results yet	See above
A further decrease in energy input and reduced costs for operating the geothermal heat pump system	COST action started in 2015, well tailored to the priority; no results yet	See above

R&I priority: SHALLOW GEOTHERMAL- GROUND COUPLING TECHNOLOGY

AREAS- *Improved pipe materials for borehole heat exchangers (BHE) and horizontal ground loops. New pipes for higher temperatures. Better thermal transfer fluid (GEO S 3)*

Specific KPI	Value of the KPI at the date of submission of deliverable D1.1	Statements and figures supporting the value provided
A Seasonal Performance Factor in the order of 5 for 2020	Project GEOCOND addresses this priority, on reserve list for funding; no results yet	GEOCOND - New cost-effective materials and designs for improved performance of shallow geothermal systems (proposal 2016)
A Hellström-efficiency (a measure of the impact of borehole thermal resistance) of about 80% in 2020	Project GEOCOND addresses this priority, on reserve list for funding; no results yet	See above

R&I priority: SHALLOW GEOTHERMAL- RESOURCES, NEW SYSTEMS AND INTEGRATION AREAS-

Creation of a new European wide database to map conductivities and potential (to 100 m depth) and feasibility of vertical BHE systems (GEO S 4)

Specific KPI	Value of the KPI at the date of submission of deliverable D1.1	Statements and figures supporting the value provided
A further decrease in energy input and reduced costs for operating the geothermal heat pump system	Ongoing activities, no true R&D-funding; KPI cannot be derived from present project status	<p>ThermoMap Web GIS application, using existing data for very shallow geothermal potential (GSHP with horizontal collectors)</p> <p>National and regional activities (e.g. in France, Germany, Italy) by Geological Surveys or academia; example: Interreg-project GRETA - Near-surface Geothermal Resources in the Territory of the Alpine Space</p> <p>Future plans: using satellites to find untapped sources of geothermal energy under cities: To better understand how thermal conduction operates between the surface and underground heat islands</p>
General coverage of GIS soil thermal properties databases	Ongoing national or regional activities, no true R&D-funding; KPI cannot be derived from present project status	No dedicated project at EU-level

R&I priority: SHALLOW GEOTHERMAL- RESOURCES, NEW SYSTEMS AND INTEGRATION AREAS- *Development of a geophysical tools for Shallow reservoir potential estimation*

– enhanced TRT methods for non-conventional systems. (GEO S 5)

Specific KPI	Value of the KPI at the date of submission of deliverable D1.1	Statements and figures supporting the value provided
A further decrease in energy input and reduced costs for operating the geothermal heat pump system	<i>No information on KPI can be derived at current status</i>	Currently no dedicated project, partly covered in other projects activities

R&I priority: SHALLOW GEOTHERMAL- RESOURCES, NEW SYSTEMS AND INTEGRATION AREAS- <i>Integration of design of the shallow geothermal system and building energy system with regard to optimum thermal use and operational strategy (GEO S 6)</i>		
Specific KPI	Value of the KPI at the date of submission of deliverable D1.1	Statements and figures supporting the value provided
A Seasonal Performance Factor in the order of 5 for 2020	Several projects have been concluded or are under way in that priority. Alas, no conclusive picture yet. An increase of SPF in the order of 5-10 % can be estimated.	Cheap-GSHPs - Cheap and efficient application of reliable ground source heat exchangers and pumps GEOTeCH: Geothermal Technology for Economic Cooling and Heating ITER (Improving Thermal Efficiency of hoRizontal ground heat exchangers TESse2b: Thermal Energy Storage Systems for Energy Efficient Buildings. An integrated solution for residential building energy storage by solar and geothermal resources Adriatic IPA project LEGEND - Low enthalpy geothermal energy demonstration Interreg-project GRETA - Near-surface Geothermal Resources in the Territory of the Alpine Space
A further decrease in energy input and reduced costs for operating the geothermal heat pump system	Several projects have been concluded or are under way in that priority. Alas, no conclusive picture yet. An improvement in efficiency in the order of 5-10 % and cost reduction by 5% can be estimated.	See above
Increase of efficiency by at least 25% through better overall system design and operation	Several projects have been concluded or are under way in that priority. Alas, no conclusive picture yet. An improvement in efficiency in the order of 5-10 % and cost reduction by 5% can be estimated.	See above

R&I priority: SHALLOW GEOTHERMAL- RESOURCES, NEW SYSTEMS AND INTEGRATION AREAS- *System concepts and applications for geothermal large scale and medium scale cooling in warm climates – hybrid systems, new high temp pipe materials and new short term storage materials and concepts. Campaign to support 50 demonstration plants (GEO S 7)*

Specific KPI	Value of the KPI at the date of submission of deliverable D1.1	Statements and figures supporting the value provided
A Seasonal Performance Factor in the order of 5 for 2020	To be reviewed in 2018	No dedicated projects at this time.
A Hellström-efficiency (a measure of the impact of borehole thermal resistance) of about 80% in 2020		
A further decrease in energy input and reduced costs for operating the geothermal heat pump system		

R&I priority: SHALLOW GEOTHERMAL- RESOURCES, NEW SYSTEMS AND INTEGRATION AREAS-
Development of ground coupling technologies and installation techniques for high capacities through hybrid systems and integration with other RES sources. Campaign to support 50 demonstration plants (GEO S 8)

Specific KPI	Value of the KPI at the date of submission of deliverable D1.1	Statements and figures supporting the value provided
A Seasonal Performance Factor in the order of 5 for 2020	To be reviewed in 2018	No dedicated projects at this time
A further decrease in energy input and reduced costs for operating the geothermal heat pump system		

R&I priority: SHALLOW GEOTHERMAL- RESOURCES, NEW SYSTEMS AND INTEGRATION AREAS-

Non-technical provisions: measures to increase awareness, harmonisation of shallow geo- standards, shallow geothermal installer EU wide training certificate, shallow geothermal Smart City deployment policy along the line of previous projects. (GEO S 9)

Specific KPI	Value of the KPI at the date of submission of deliverable D1.1	Statements and figures supporting the value provided
Improve awareness of technology, Create skills and ensure quality	Various projects, no KPI defined	TERRE - Training Engineers and Researchers to Rethink geotechnical Engineering for a low carbon future REGEOCITIES - Regulations of Geothermal HP systems at local and regional level in Europe, Including the campaign: HEAT UNDER YOUR FEET GEOCOMMUNITIES (???) GEOTRAINET - Geo-Education for a sustainable geothermal heating and cooling market FROnT - Fair Renewable Heating and Cooling Options and Trade