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National Report for ROMANIA

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Definition of shallow geothermal Energy

Does a definition exist in your country?

Yes

Answer:

1. In 2008 the definition of GEOTHERMAL ENERGY provided by RES Directive was transposed in national legislation, in Law No. 220/2008 that establishes a System for the Promotion of Electricity Generation from Renewable Sources. The exact version of the definition in Romanian language is presented in Article 2:

“... o) energie geotermala — energia stocata sub forma de caldura sub stratul solid al suprafetei terestre;...”

2. NO, there are not definitions of minimum / maximum temperatures, depths or other parameters in legislation.

1 Introduction

1.1 Current situation in your country

Designers are predominantly

National

Installers are predominantly

National

Technology providers are predominantly

National

Designers are predominantly independent from installers

Yes

If no, specify:

Designers' market is predominantly

Local

Regional

National

Installers' market is predominantly

Local

Regional

National

Please describe briefly the market situation in your country, with respect for the period year 2006-2011

Answer:

1. Due to (a) higher initial costs, (b) lack of incentives, (c) low living standard, in the period 2006-2011 and especially after 2008 (the crisis beginning) the market progresses very slowly. In fact, after 2008-2009 the construction market in general (and GSHP installations were not excepted) almost froze.
2. The very few applications implemented in this period of time were (a) some commercial applications, especially in car market area (showrooms, service facilities etc.) or (b) small residential applications which did not a representative trend in house building industry.
3. In Romania there are not local manufacturers for heat pumps; all GSHP included in HVAC installations are imported from EU: Germany, Austria, Sweden, Italy etc. (especially from Bosch for 6-17 kW, Buderus for 6-17 kW, Rehau for 5,4-45 kW, Dimplex, Stiebel – Eltron, Viessmann for 1,5-117,8 kW, Ochsner for 9-92 kW, Tonon-Forty etc.) and from North America - USA and Canada (Florida Heat Pump for 5,7-88,6 kW, Water Furnace, Trane, Tetco, Hydron Module etc.).
4. The import custom codes are not biunique and no authority is invested to track the number and capacity of imported GSHP. They are imported under 2 different codes according the EU rules Nr. 106/2011 (last version from 27th of September 2011 that modified Annex I of the Regulation CEE no. 2658/1987) regarding the common custom tariffs and statistics. According to this document, imported GSHP can be included in one of the following two codes:

- 8415.81.00 – Equipment for air conditioning including reversible heat pumps
- 8418.61.00 – Equipment for refrigeration and cooling including heat pumps, other than 8415.

For the reason of non-unique codes, a tracking of imported / sold/ included in applications GSHP is almost impossible. This situation has a negative influence on the traceability of HVAC GSHP applications in particular, and on their market in general.

As an overall conclusion, in **Romania the GSHP market has a significant advance in front of the legislative and normative system.**

Please describe the typical procedures for a typical one well installation.

Answer:

A simple open installation does not need a special approval procedure, the wells being considered as any other water supply solutions.

The same situation is for closed systems where drillings < 100 meters depth must not be specially approved as a solution accessing Earth energy, but as a solution accessing underground waters. The approval is in this case included in the "Environment Authorization" and is issued by the National Waters Authority. When the drilling are > 100 meters deep the approval must be issued by the National Authority for Mineral Resources (ANRM). Because ANRM does not issue a drilling procedure for GSHP applications purposes, all closed systems in Romania are <100 meters.

As a conclusion, in Romania there are not specific norms for water supply wells / drillings and water wells / drillings for energy purposes.

1.2 Barriers

Answer:

1. Economic barriers:

- Low living standard,
- Low average income
- Focus on initial costs instead of Life-Cycle Cost in feasibility studies
- Lack of financial support both in residential and commercial applications (no green certifications which are considered by the law only for electricity, not for thermal energy, no feed-in tariffs, no tax deductions);
- Lack of legislative predictability and transparency in fossil fuels prices and national strategy for subsidizing these costs by the State
- Lack of State's interest for thermal energy and lack of predictability in the implementation of incentives for thermal energy (green certificates for thermal RES energy, white certificates for thermal energy efficiency, blue certificates for high efficiency < 1 MW cogeneration and red certificates for other cogeneration solutions).

2. Organizational barriers

- Lack of viable business models in Romanian organizations able to minimize the overall implementation costs in order to make this kind of applications (HVAC GSHP) cost-effective

- Organization culture based on minimum effort approach and no-risk;
- Lack of viable business models based on new technologies in period of time marked by structural, national and European crisis

3. Information barriers

- Low level of knowledge of deciders / politicians / planners / investors
- Low level of knowledge of company leaders in constructions / installation
- Low level of knowledge of installers / construction workers
- Lack of national data bases with information on functional GSHP applications, best-practice description (place, technical data, equipments, installer companies, seasonal performance factors, monitored efficiency, costs, tips etc.)
- Lack of technical documents and web sites with accessible information, lack of sound studies with analyzes on the efficiency and applicability of each RES technology for heating and / or cooling
- Lack of transparent information regarding the opportunities and interdictions in GSHP applications, including forbidden zones, drinking water intake proximity, natural reservations, contaminated areas
- Lack of evidences / tracking regarding previously done test drillings and measurements of soil characteristics
- Lack of sound official information information regarding shallow geothermal potential

4. Legal / regulative barriers

- Lack of serious preoccupation of national authorities on RES energy, especially on thermal energy materialized in an inconsistent legislation in the domain, lack of strategic documents and measures – see NREAP
- Lack of preoccupation for controlling the current situation regarding the implementation of NREAP at European level and lack of transparency at national level in presenting EU feedbacks
- Large gap between national objectives set by central authorities and local authorities implementation activity and measures
- Lack of central authorities capacity to integrate and understand provisions of different EU Directives focused on different aspect of the same processes (RES Directive, EPBD, Energy efficiency at end-user etc.)
- Lack of a national training frame / strategy / roadmap for specific activities
- Lack of consistent and convincing incentives set by middle and long term strategies and laws
- Lack of clear, transparent and simple specific regulations on shallow geothermal property and licenses, lack of procedure for GSHP systems authorization
- Lack of interest of central authorities in attracting civil society in debating and deciding RES strategies, national programs

- Lack of preoccupation of national deciders in using RES in general, and GSHP in particular, for the state owned buildings in order to make savings in the state budget (schools, universities, hospitals, military facilities, headquarters for central and local authorities etc.)

2 Review of existing documents (or in progress)/Tools to support SGE development

2.1 National level

- **Dedicated Web sites and GIS (general public)** **No**
- Support tools**
- Geothermal operations inventories* **No**
- Underground operations inventories* **No**
- Geothermal resources evaluation* **No**
- Geothermal resources management* **No**
- Water resources management* **Yes**
- but NO for energy exploitation purposes (HVAC GSHP systems)*
- Other*
- **Best practice (or technical) Guideline documentation** **No**
- **Training activities dedicated to SGE** **Yes**

Answer:

The only training activity was in October 2010 Geotraining course organized in Bucharest within the European project GEOTRAINET - Geo-Education for a sustainable geothermal heating and cooling market IEE/07/581/S12.499061, www.geotraining.eu

- **certification for professionals** **No**
- If yes, is it mandatory?
- certification for organizations** **No**
- If yes, is it mandatory?
- **Codes/Regulations** **No**
- **Other**

2.2 Local/Regional level

Answer:

There are Municipalities and Cities that shown their interest for HVAC GSHP applications in urban areas. In Bucharest there are the majority of applications, especially commercial.

They were realized mainly with open systems up to 2005 and only with closed systems after 2005. The reasons are (a) increase of thermal load of the buildings that had to cover heating, cooling and hot water and (b) low level of underground waters flows.

Municipalities have no special regulations for this kind of applications.

- **Dedicated Web sites for information about Shallow Geothermal Energy**

Only the web sites of commercial companies that sell GSHP and few commercial companies that are specialized in entrepreneurial activities for HVAC.

- **Support tools**

- Geothermal operations inventories* **No**
- Underground operations inventories* **No**
- Geothermal resources evaluation* **No**
- Geothermal resources management* **No**
- Water resources management* **Yes**
but NO for energy exploitation purposes (HVAC GSHP systems)
- Other*
- **Best practice (or technical) Guideline documentation** **No**
- **Training activities dedicated to SGE** **No**
- **certification for professionals** **No**
- **or quality Charter**
- **certification for organizations** **No**
- **Codes/regulations** **No**
 - **Other**

3 Subsidies /Financial Incentives available

3.1 National level

Yes

Answer:

In Romania, the two type of incentive sources for GSHP projects are:

- **European Source**, through the Economy Ministry – Structural funds (POS CCE – Operational Sectorial Program “Increase of Economic Competitiveness” - Priority Axis no. 4 – DMI 4.2. “Green Energy”
- **National Source**, through Environment Fund Administration

Projects financed by Environment Fund Administration (EFA)

EFA finances are collected through Environment taxes and offer incentives for renewable heating and cooling RHC – GSHP through the following programs:

- **RES ENERGY** – Only for initial investments, for maximum 50% of the total eligible amount (maximum 40% in Bucharest). The maximum amount is 30 million RON – 6,7 Million Euro (1 Euro = 4,5 RON) for a project. In 2011 the total amount allocated to this program for all projects was 0,9 million RON – 0,2 million Euro (200.000 Euro). Then the program was stopped because of funds’ lack.
- **“GREEN HOUSE” – INDIVIDUALS APPLICATIONS** – Projects (residential applications) - maximum 8.000 RON /project (under 2.000 Euro). Between 2009-2011, 6 RHC-GSHP projects were financed by this program with a total of 12.000 Euro.
The amount offered through this program is 4 times smaller than a GSHP catalog price. On the other hand, a HVAC GSHP application includes also another expensive component - the ground heat exchanger. This is why this program is not an attractive option for individuals interested in GSHP solution.

- **“CASA VERDE / GREEN HOUSE” – ORGANIZATION APPLICATIONS**
 - For projects initiated by local authorities with maximum 4 million RON / project (less than 1 million Euro/project), public institution with maximum 2 million RON/project and religious buildings with maximum 0,5 millions RON/ project.
 - In total, a project can be supported with maximum 90% from total eligible value of the project.
 - In the period 2009 – 2011 this project financed **only one RHC-GSHP project** in 2009 with 672.515,5 RON (approximately 150.000 Euro).
 - This program was approved but didn't allocate resources for a GSHP project in Bucharest District 1 City hall .

Projects financed by the **MINISTRY of ECONOMY**

The most consistent potential financing source from European funds for important RES applications is through Structural funds (POS CCE – Operational Sectorial Program “Increase of Economic Competitiveness” - Priority Axis no. 4 – DMI 4.2. “Green Energy” “Valorificarea resurselor regenerabile de energie in producerea energiei verzi – The use of regenerable energy sources for the production of green energy”.

This Priority Axis has as target “the support of the implementation of the investments in new energy capacities based on RES, such as: biomass, small power hydro centrals, solar, wind, bio-fuels, geothermal resources and other RES”.

Since the beginning in 2010, in Romania no GSHP project was financed through this program. The decision of the Ministry to exclude GSHP projects from this program till the end of 2012 was based on the lack of a unitary European methodology for the calculation of the system efficiency in terms of primary energy produced through the thermal plant with GSHP.

The Ministry considered the last phrase from RES Directive which set a deadline for this unitary European methodology / guidelines in January 2013 and decided to exclude GSHP projects till January 2013.

RGS made a lot of actions at national and international level including our messages to EGEC and EU specialists but, unfortunately without a positive result.

RES Directive - Annex VII provision is:

“ANNEX VII Accounting of energy from heat pumps

The amount of aerothermal, geothermal or hydrothermal energy captured by heat pumps to be considered energy from renewable sources for the purposes of this Directive, *ERES*, shall be calculated in accordance with the following formula:

$$E_{RES} = Q_{usable} * (1 - 1/SPF)$$

where

Qusable = the estimated total usable heat delivered by heat pumps fulfilling the criteria referred to in Article 5(4), implemented as follows: Only heat pumps for which $SPF > 1,15 * 1/\eta$ shall be taken into account, —

SPF = the estimated average seasonal performance factor for those heat pumps, —

η is the ratio between total gross production of electricity and the primary energy consumption for electricity production and shall be calculated as an EU average based on Eurostat data.

By 1 January 2013, the Commission shall establish guidelines on how Member States are to estimate the values of Q_{usable} and SPF for the different heat pump technologies and applications, *taking into consideration differences in climatic conditions, especially very cold climates.* (<http://eur-lex.europa.eu/LexUriServ/>)

The Ministry of Economy maintained the initial decision even after they learned the EGEC feedback regarding it:

"This is a very serious issue. Of course the understanding of the text of RES Directive by the Romanian authorities is not what the authors of the directive in the EC had in mind; I can vouch for that as we had frequent contacts with RES authors (the principal author of the original text, and the person currently responsible for following the NREAPs).

Again, the position taken by the Romanian authorities is not justified by the directive."

Burkhard Sanner – EGEC President

RGS considers that this decision is one of the explanations of a slow development of GSHP applications in the mentioned period of time (2010 – 2012).

In fact, RGS demonstrated (any energy auditor could make this demonstration) that the efficiency of a HVAC GSHP system can be calculated based on the algorithms provided by:

- RES Directive (annex VII),
- Directive 2006/32/EC – Energy Efficiency at end user
- The Romanian Methodology MC001 "Calculul performantei energetice a cladirilor" based on Law 372/2006 that transposes EPBD (Energy Performance in Buildings Directive)
- The Standard SR EN 15217:2007 – Energy Performance in Buildings.

Thus, according RES Directive and Directive 2006/32/EC:

"Only the applications that satisfy the following condition will be accepted: $SPF_{min} > 1,15 \times 1/\eta = 1,15 \times 2,5 = 2,875$ "

Other financing national programs were the Operational Sectorial Environment Program developed by the Ministry of the Environment and Forests that approved and financed only 1 GSHP project with an installed power of 1000 kW in Constanta. The application is now in final phase but it was stopped because of the bankruptcy of the beneficiary.

For an effective support of GSHP market, the incentive should be 50% from the eligible investment amount with percentage ranges of support depending on the Seasonal Performance Factor (SPF) of the system. 2/3 from the incentive should be transferred to the applicant at the investment start and 1/3 at the end, based on a SPF and system certification made by a authorized energy auditor (auditing costs being eligible).

3.2 City or regional level

Insurance systems

No

No

4 Existing action plans

4.1 Elements of the NREAP applying to SGE

None

4.2 Sub-national energy scenarios

Legal obligation

No

Volunteer

Yes

Answer:

In Covenant of Mayors there are 83 signatures from Municipalities, cities, regions from Romania. Only 16 of them elaborated their SEAPs and sent them to CoM. No results monitored. No geothermal / GSHP chapters in these SEAPs.

5 Legal framework and Cities Planning

5.1 Current legislation and permit procedures in relation to SGE

5.2 (Underground) Space planning

Is there a will in your country to link urban planning closer with renewable energy plans?

No

Answer:

In all Romanian municipalities there are different levels of Urban plans in which RES solutions are considered, especially solar source for heating and hot water in single house residential areas. But, large number of residential and commercial buildings in Romanian municipalities use district heating source managed by the central and / or local administration. These power plants owned by the state are interested only in electricity production and for this reason, their interest is focused only on wind equipments.

No UNDERGROUND space planning in Romanian municipalities.

No special RES plans in urban planning of Romanian municipalities.

Are there specific considerations of renewable energy integration (i.e geothermal energy) into construction licenses?

No

Answer:

EPBD Directive was transposed in national law 372/2005. In the initial form (2005), the law did not include a Sanctions chapter, so the provision regarding the analyze of the heat pump alternative in the feasibility study was not compulsory in fact.

After the issue of Directive 2010/31/EU, the law was modified and Art. 10 provisions are now:

"Art.10.

(1) Pentru clădirile noi, prin certificatul de urbanism emis de autoritățile administrației publice locale/județene competente, în vederea obținerii, în condițiile legii, a autorizației de construire pentru clădiri, pe lângă obligativitatea respectării cerințelor minime de performanță energetică se va solicita întocmirea unui studio privind posibilitatea utilizării unor sisteme alternative de eficiență ridicată, în funcție de fezabilitatea acestora din punct de vedere etnic, economic și al mediului înconjurător.

(2) Aceste sisteme alternative pot fi:

- a) sisteme descentralizate de alimentare cu energie, bazate pe surse de energie regenerabilă;
- b) sistem de cogenerare;
- c) sisteme de încălzire sau de răcire centralizate sau de bloc;
- d) sisteme care utilizează **pompe de căldură**;
- e) schimbătoare de căldură sol-aer;
- f) recuperatoare de căldură.

(3) Studiul prevăzut la alin. (1) însoțește documentația tehnică pentru autorizarea executării lucrărilor

(4) Studiul cu privire la posibilitatea utilizării sistemelor alternative prevăzute alin.(2) lit.a), b), d), e) și f) poate fi efectuat pentru o clădire sau pentru grupuri de clădiri similare din aceeași localitate. Pentru sistemele colective de încălzire și răcire, studiul poate fi efectuat pentru toate clădirile racordate la același sistem."

This article transposes the provisions of Art. 6 of the Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast):

"Article 6

New buildings

1. Member States shall take the necessary measures to ensure that new buildings meet the minimum energy performance requirements set in accordance with Article 4. For new buildings, Member States shall ensure that, before construction starts, the technical, environmental and economic feasibility of high-efficiency alternative systems such as those listed below, if available, is considered and taken into account:

(a) decentralised energy supply systems based on energy from renewable sources;

(b) cogeneration;

(c) district or block heating or cooling, particularly where it is based entirely or partially on energy from renewable sources;

(d) heat pumps.

The new revision of the law includes now a Sanctions part - Chapter X which includes sanctions for Article 10 non-compliance. The new law is not entered in force yet.

Is there a regulation concerning interactions between thermal uses of the underground and other utilisations (such as constructions, use of water, ...)?

No

Is there a national/regional/local database of wells?

No

Are there public databases concerning all the uses of the underground?

No

5.3 Integration of H&C systems in buildings

Do you have specific targets for integration of H&C systems (in parallel to development of renewable energy) concerning renovation/refurbishment of buildings?

Yes

Answer:

Romanian experts consider that a large action of rehabilitation in urban buildings is a priority which could determine savings of more than 20% from the current consumption because:

- in Romania the energy consumption only for heating and warm water in residential buildings connected to district heating systems is 37-49% from the total energy consumption of Romanian population;
- the residential buildings (communist "blocks of flats") represent 72% from total residential buildings in urban area;
- approximately 58% from such existent buildings (2,4 million apartments) built before 1985 need urgent rehabilitation and thermal modernization measures.

The European Standards EN 832 and EN ISO 13790 allow a unified approach of energy consumption in buildings in order to accomplish the provisions of the Directive CE 91/2002 which set the obligation of Energy Certificate in buildings.

According to this, Class A corresponds to the best efficient buildings with consumption less than 30 kWh/m².year, and the worst level, Class G correspond to primary energy consumption higher that 200 kWh/m².year.

In 2009, the Government Emergency Ordinance no. 18/2009 (see http://www.allenergy.ro/resurse/site/legislativ/OUG_18_2009_reabilitare_termica_cre_sterea_performantei_energetice_a_blocurilor_de_locuinte.pdf) modified in 2011 by Law 158/2011 (see

http://www.dreptonline.ro/legislatie/legea_158_2011_aprobare_oug_18_2009_creste_rea_performantei_energetice_blocuri_locuinte.php) set a target for the annual energy consumption for heating less than 100 kWh/m².year, starting January 2011 and imposing the obligation of the apartments owners to obtain a Energy Performance Certificate.

After 01.01.2011, theoretically, no selling or even renting actions are forbidden without this certificate according the Methodology MC 001/2006 based on the Law 372/2005 based on EPBD. In reality, this deadline was / is postponed everytime and the decision didn't enter in force yet.

Do you have a specific regulation on H&C systems concerning new constructions?

Yes

Answer:

Law 372/2005 that transposes EPBD into Romanian legislation was updated many times, including in 2012. It provides rules regarding the measures for the improvement of energy performance of buildings taking into account the outdoor climatic conditions, the location, the comfort level, the optimum costs, the energy performance requests and the improvement of urban aspect of the cities.

At the same time, the improvement of energy performance of buildings (new or rehabilitated) must be known both by the owner and by the public through the Energy Certificates, which have an important impact on energy savings, improvement of urban life in general and environmental protection.

The law text is in the site of the Romanian Parliament:

http://www.cdep.ro/proiecte/2005/400/30/6/leg_pl436_05.pdf

What are the intentions in the regulations and specific targets and how does it fit with geothermal energy development?

Are existing plants subject to periodic monitoring/report?

No

Are existing plants subject to mandatory maintenance?

No

Are operational performances (e.g. energy efficiency) guaranteed?

No

6 Additional Table

We propose the tables below, From the publication of Haehnlein, Bayer, Blum, 2010 (To facilitate the comparison of the situations between countries)

We suggest 2 tables:

- a) For Ground Water Heat Pumps
- b) For vertical Heat exchangers connected to Heat Pump

TABLE 1

For Ground Water Heat Pump	Possible answer	Comments
Are there temperature thresholds?	No	No -
If yes:		
Please report the specific values	Technical thresholds	
	Relative values	
	(limit for heating/cooling)	
	Absolute values	
	(maximum/minimum temperature)	
	Technical thresholds	
	Relative values	
	(limit for heating/cooling)	
	Absolute values	
	(maximum/minimum temperature)	
Are the thresholds legally binding?	Yes/No; Level (state, city, etc.)	
Which are the relevant laws/ordinances?	Title, year	
What is the basis for these values?	Rule of thumb	
	Scientific studies	
	Something else	
If no:		
Is there a particular reason?	Yes; Explanation 1 (after Table 1)	
Are regulations planned for the future?	No; Explanation 2 (after Table 1)	
Are there regulations referring to minimum distances?	No	
If yes:		

Which are the relevant laws/ordinances?	Title, year, name of the law/ordinance	
What is the basis for these values?	Rule of thumb	
	Result of research	
	Something else	
If no:		
Is there a particular reason?	Yes; Explanation 3 (after Table 1)	
Are any regulations planed for the future?	No; Explanation 4 (after Table 1)	
Does your country have any other laws, ordinances or regulations concerning thermal groundwater use?	No	
If yes, which are the relevant laws or ordinances?	Title, year, comments	

Explanation 1

The Romanian normative system does not include specific rules / norms / standards / laws for HVAC systems with GSHP based on open solution. The only applicable rule is related with the re-injected water temperature that must be by with less than 5° C lower (heating systems – winter) or higher (cooling systems – summer) that the extracted water temperature. This rule is not a specific one for HVAC systems with GSHP based on open solution, but is a general rule of the National Water Authority.

Because in the last 10-14 years the local offices of NWA received clarification requests from the investors in HVAC systems with GSHP based on open solution (especially for residential applications), some local offices of NWA started to impose the following rule: in order to obtain the final operation authorization, the owner of the building (with HVAC systems with GSHP based on open solution) should present a file with the third party monitoring results of intake – return waters temperatures. Based on these results, the local office of NWA issues the final operation authorization.

Romanian Geoexchange Society – RGS asked NWA to issue a general rule for all this kind of applications but the answer was that NWA needs to take this decision based on a “research” for which they have no founds.

Explanation 2

Due to the crisis, the funds for research were drastically cut and both the medium and long term research strategies were abandoned for the moment.

Explanation 3

A similar situation / explanation is for the distance between the boreholes. No rules / norms / standards / laws. Only the designer / installer experience decides the solution.

On the other hand, a critical issue is that, because of ignorance, some local offices of NWA (mentioned in Explanation 1) decided that the **re-injected waters could contaminate and pollute the aquifer and interdicts the re-injection of waters in the same aquifer**. In that situation, the owners of this kind of applications had two options:

- a. to discharge the water to the surface waters (rivers, lakes) if they are in the proximity of the building or to discharge in the sewing network. This solution was chose by the owners of commercial applications especially in Bucharest area because they are under a continuous control of the state authorities.
- b. to discharge in the same aquifer through a re-injection borehole ignoring the interdiction (which, anyhow, is not at national level). This is the case of residential applications. The situation is perpetuated by the fact that no central / local authority has an inventory of HVAC systems with GSHP based on open solution.

Explanation 4

In Romania, the market of this kind of application grew more rapidly that the reaction speed of central authorities who are entitled to create rules and to follow their implementation and compliance.

For vertical heat exchangers	Possible answer	Comments
Are there distance thresholds? Minimum distance between 2 systems Minimum between two vertical heat exchangers	No No	T° of recharge or distance between 2 systems
If yes:		
Please report the specific values	Technical thresholds	
	Relative values (limit for heating/cooling)	
	Absolute values (maximum/minimum temperature)	
Are the thresholds legally binding?	Yes/No; Level (state, city, etc.)	
Which are the relevant laws/ordinances?	Title, year	
What is the basis for these values?	Rule of thumb	
	Scientific studies	
	Something else	
If no:		
Is there a particular reason?	Yes; Explanation 1	
Are any regulations planed for the future?	No; Explanation 2	
Are there regulations referring to minimum distances?	No	

Explanation 1

In the case of vertical heat exchangers (close vertical solution) the situation and reasons are similar with the ones presented after the previous table. The distance between 2 drillings is higher than 5 meters and depends on designers' decision based on their knowledge and experience.

The lack of an inventory of the functional applications leads to the futility of a regulation on minimum distance between 2 heat exchangers. Now there are in Bucharest some big heat exchangers in commercial applications especially in car facilities – showrooms and services (with over 100 drillings at maximum 100 meters depth) which are not monitored by the state authorities responsible with the production of energy from renewable sources.

Explanation 2

In the near future (starting 2012) a huge application will start near Bucharest: ELI – NP Extreme light infrastructure Nuclear Physics facility that will have a ground heat exchanger installed in 1000 drillers at 100 meters depth.