



D3.1.

Reports on National Workshops including questionnaires, main conclusions and feedback

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1. Introduction: identifying barriers

The first task of the WP3 of the GeoDH project aims at understanding the regulatory framework concerning the exploitation of geothermal energy for district heating and cooling (DHC) in 14 European countries, in order to identify legal and regulatory barriers which hinder the development of their market in Europe. At a later stage, the obtained information will be useful to propose recommendations for better national and especially regional and local regulations, including specific measures addressing the simplification of procedures, attribution of licenses and ownership of the geothermal resources.

Other EU projects such as K4RES-H and GTRH have already gathered similar information, but GeoDH aims to go beyond such results, in terms of country coverage and multidisciplinary issues addressed.

To achieve these purposes, the involvement of key actors (DH geothermal and companies, ESCOs and financial institutions and especially regional and Local Authorities), which would help in outlining a comprehensive framework, is necessary to identify barriers hindering the development of geoDHs (geothermal district heating) in Europe.

The collection of the necessary information was carried out homogeneously in all the 14 partner countries, through:

- **14 national workshops**, aiming at collecting information to identify and agree on the current barriers for geoDHs development, as well as discuss preliminary regulatory recommendations.
- **3 questionnaires** (one for each group of key actor) distributed to people attending the national workshops. The questionnaires intended to collect both general and country-specific information. Data collected through the questionnaires also complemented the information obtained during the workshops.

2. Methodological Framework

In order to gather a large amount of homogeneous and consistent information in a cost-efficient way, it was established to collect information about the barriers on geoDH development, involving three categories of key actors, each one providing information from its different points of view:

- **Public Authorities:** Regional and Local Authorities involved in proposing laws for land use planning, issuing authorizations for the exploration and exploitation of low enthalpy geothermal resources, proposing public subsidies and other incentives to promote the use of geothermal energy in DHC systems (e.g.: municipalities and provincial and regional offices dealing with geothermal energy and DHCs). In addition to provide information on their territory, Public Authorities were of great importance, since they could provide useful information to remove regulatory barriers that hinder the development of new geoDH networks and to collaborate on drafting relevant proposals to policy makers who intend to promote the development of this technology in their territory. In this regard, Public Authorities were identified as the main “target group” for recommendations resulted from next steps of GeoDH project.

- **DH and geothermal companies:** companies operating in the geothermal sector (exploration, drilling, etc.) and/or designers, installers and managers of DHC networks. This category of key actors is important as it can provide useful information on the geoDH market.
- **Energy Service Companies (ESCO) and other financial institutions:** given the function of down-payment, ESCOs were put in the same category of financial institutions, involved in financing investments and in the management of geothermal DHCs. Other than ESCOs, these organizations may be banks, lending institutions and insurance companies (e.g. for the geothermal risk coverage). They are particularly important since they collaborate to identify the major financial barriers and to purpose innovative financial models supporting geothermal DHCs.

2.1. National Workshops

From October 2012 to June 2013, 1-day workshop was organized in each of the 14 partner countries. The objective was to collect information to identify and to agree on the current barriers for geoDH development and to discuss preliminary regulatory recommendations. Indeed, national workshops represented important occasions of meeting for stakeholders and Public Authorities, during which geoDH design, building and management cases were presented, highlighting regulatory, legislative, policy and financial issues. During these events examples of best practices were also presented.

Generally, the national workshops programs were scheduled in two parts:

- **Presentations and slideshows:** to present study cases, new technologies, best practices and possible barriers concerning financial and regulatory issues.
- **Roundtable:** to allow invited people to discuss about main obstacles which hinder the development of geoDH market in their regions or countries, as well as propose possible solutions to such issues.

Local GeoDH partners organized the national workshops in cooperation with the project coordinator EGEC (European Geothermal Energy Council). All workshops were held in national language (with translation when necessary) and were targeting around 50 participants, among the above cited key actors.

In order to ensure a fair exchange of information within the GeoDH consortium, each partner attended 3 workshops and the coordinator EGEC all the 14.

2.2. Questionnaires

In October 2012 CoSviG drafted three questionnaires, one for each of the three categories of key actors. These questionnaires represented an important source of interdisciplinary information to investigate on regulatory market barriers identified by each of the 3 groups of key actors, as well as to provide supplementary information to those obtained during the project's national workshops. These three questionnaires consisted of two parts:

- **General information:** to gather information about the organization, its experience and degree of involvement in the geothermal and/or district heating sector
- **Country-specific information:** to identify regulatory, legal and financial information which hinder the diffusion of geothermal DHCs at national and regional level, in addition to understanding the different point of view of each category key actor.

In order to gather homogeneous information about the 14 partner countries, the three questionnaires were drafted in English and sent to the other 9 GeoDH partners, which provided useful suggestions to ensure their

suitability to the completion by operators of the involved countries. Once approved, the three questionnaires in English were sent to each partner, to be translated into national languages.

Each partner distributed the three translated questionnaires both in advance (by email) to people invited to the national workshops and during the events. After workshops, questionnaires were also sent to members of particularly important ESCOs, companies and Public Authorities that could not attend the events. Results of questionnaires were then sent back to CoSviG, for statistical analysis and interpretation, in order to have additional information about barriers hindering the geodH market development.

3. Workshop abstracts

In this section a short summary of each GeodH national workshop is reported. To collect as much as possible information about issues existing in each country, workshop outputs are completed with main results of the questionnaires. Further details on each workshop can be found on reports in **Annex 1** and slides of each presentation are available at the project's website (www.geodh.eu), under the section "EVENTS".

3.1. National workshop - United Kingdom (juvenile geodH market), London 15/10/2012

N. of Participants: 42

Speakers: Sanner B. (EGEC), Nádor A. (MFGI), Pasquali R. (GeoServ), Jackson T. (SKM), Smith M. (Cofely District Energy)

Main issues: British Local Authorities have to define their environmental strategy and have to evidence the importance of geothermal energy in local planning. Concerning regulations, the use of geothermal heat is not considered by the current Mining and Hydrocarbons law, although geothermal resources are public and developers pay royalties for its use. In this respect, although these issues do not seem to be a priority for the central government, a simplification of the licensing and authorization scheme is needed to foster investments. Moreover, no protection exists for risks linked to geothermal heat content and Local Authorities have unequal information about potential for DHs in their territories. About DH networks, there is the necessity of: reduce administrative processes and burdens and conceive plants also for low temperatures and shallow geothermal. Participants also agreed on the need to train Local Authorities and especially planning officers. Main financial barriers were identified as lack of incentives for investments in RES heat use, explorations and drilling, since geodHs are still too capital intensive and project financiers need guarantees from developers, as well as a better knowledge on operational costs and plants' lifetime.

Best practice examples: in Southampton the geodH is owned by Cofely to de-risk the project for the Local Authority, but profits are shared with the City Council. Hungary has a new mining law, establishing a protection zone to geothermal developers. The Netherlands has a risk insurance scheme.

3.2. National workshop - Bulgaria (juvenile geodH market), Varna 20/02/2013

N. of Participants: 28



Speakers: Tonev T. (UBBSLA), Angelino L. (EGEC), Vichev N. (TO STU), Atanasov G., Valcheva S. (Basin directorate Black Sea region), Rusev D. (MB of TO STU)

Main issues: although Bulgaria has a good geothermal potential for heating purposes, the current use of this energy source is very low. This is probably due to the lack of communication between authorities responsible for issuing permits and installers, which results in a low knowledge about necessary administrative steps for the use of geothermal energy. Moreover, although technical and design skills exist, designers still have diffidence in developing geoDH projects, because of a limited experience in this sector. Questionnaires proved the inclusion of DHs into National and Regional energy plans and the existence of a legislative framework for DHs, while participants agreed on mistrust of people towards DHs, despite the end price of a DH kWh is the most affordable. This is mostly due to the existing obsolete distribution infrastructures, which cause impossibility to use heat meter and calculate bills equivalent to the consumed heat. Other main identified obstacles are: high construction costs (mainly due to the drilling phase), high degree of risk for a long-term investment in geoDH and inadequacy of economic support tools (subsidies and low rate credit/loans). Therefore the Bulgarian geoDH sector mainly needs financial support from EU, banks and other financial institutions, as well as awareness campaigns on benefits of geoDHs.

3.3. National workshop - The Netherlands (juvenile geoDH market), Heerlen 03/04/2013

N. of Participants: 28.

Speakers: Sanner B. (EGEC), Schoof F. (Dutch geothermal platform), Kip H. (Dutch heat network organization), Bakema G. (IF Technology), Hiddes L. (ceo Minewater).

Organisational constraints: 5 questionnaires were collected from Public Authorities and 1 from ESCOs, while no questionnaires were collected from DH and geothermal companies, probably due to difficulties in completing.

Main issues: the Dutch Geothermal Platform drafted a plan for geothermal energy with a goal of 11 to 14 PJ by 2020, but this has never been included in NREAP. The main legal constraint observed is the overlapping of different laws on geothermal energy, which may negatively influence issuing permits procedures. As regards DH networks, legislation refers to 4 acts, since a specific law does not yet exist. For instance Heat Act (never really started) bases the heat fares calculation on the natural gas principle, while the forced connection to a H-C infrastructure is covered by the Building Act and local governments can apply it after drafting a local Heat Plan. This is a procedure that politicians do not always intend to issue. In addition the Dutch government does not enforce in using the energy label, while the energy performance coefficient (based on the 2010/31/EU Directive) is mandatory only for new constructions (not for refurbishment) and it is not optimized to calculate energy performance of buildings. As regards financial supports, the current feed-in-tariff scheme establishes limits on the eligible production of renewable heat and it exclusively supports the energy production, ignoring costs of heat distribution infrastructures. This is due to the lack of geothermal lobby, such as it is for other RES like wind power. Further identified barriers are the lack of qualified specialists in the geoDH sector and the absence of legislation concerning cooling.

Best practice examples: the guarantee scheme for exploration risks is giving positive effects to the Dutch geothermal sector.

3.4. National workshop - Ireland and Northern Ireland (juvenile geoDH market), Dublin 09/04/2013

N. of Participants: 22.

Speakers: O'Neill N. (SLR), Angelino L. (EGEC), Pasquali R. (GeoServ), McAuley D. (SEAI), Miller C. (RPS).

Main issues: Ireland is a juvenile market, for both deep geothermal and DH and the first DH, for which the geothermal contribution is not well-defined, is currently planned in Dublin. As far as geothermal, main barriers are: poor knowledge of the potential and the lack of a clear national strategy to boost this technology, since a regulatory framework (also about granting rights to explore and develop resources) is still absent and NREAP does not provide for geothermal H-C. However some local initiatives concern geoDH. In addition, the main strategic documents have no clear policy objectives for DH and a framework regulating the Heat Market is absent. In this regard two studies about UK, looking at the 2050 horizon and foreseeing the long-term heat demand, are considered as strategic although more clarity on procurement legislation and the need to consider geothermal as a local resource are necessary in Northern Ireland. As for financial barriers, participants agreed on high CAPEX and OPEX required for a geoDH and on problems linked to mining risk coverage. Others economic obstacles addressed are: lack of off-take agreements for heat supply to secure bank funding, lack of support for DH (in Ireland it is missing also for RES-heat), need to consider separately geothermal and DH in project financing, government should invest in a demonstration project and need for more support to Local Authority and Private Company partnerships.

3.5. National workshop - Romania (juvenile geoDH market), Bucharest 16/04/2013

N. of Participants: 53. The event was concatenated to the national workshop of the IEE Regeocities project.

Speakers: Burchiu S. (Dean TUCEB), Gavriluc R. (RGS-TUCEB), Angelino L. (EGEC), Kujbus A. (Geothermal Express), Muțiu I. (Transgex), Vlad V. (EBRD Romania), Zeghici R. (RGS-TUCEB)

Organisational constraints: need to organize regional events since bringing together people from all around the country is difficult; difficulties in capturing a long-lasting interest from participants with different knowledge levels; questionnaires are too long and complex.

Main issues: high construction and drilling costs, lack of continuity and predictability of incentives, low and unbalanced distribution of geothermal potential, low level of market demand and lack of experienced specialists.

3.6. National workshop - Slovakia (transition geoDH market), Bratislava 11/10/2012

N. of Participants: 39

Speakers: Slovak L. (AGEO), Angelino L. (EGEC), Nádor A. (MAFI), Vitai Z. (Porcio Ltd.), Minarovic M. (Union of Towns and Cities of Slovakia), Halas O. (Slovgeoterm), Kočíš I. (European Technology Platforms), Kello M. (VUB bank), Krištofič T. (Geothermal Anywhere)

Main issues: despite the existence of a good geothermal potential in Slovakia, discrepancies in RES national legislation and low awareness of representative of municipalities (despite their high interest) result in a lower development of the geothermal energy sector, compared to other renewables. Moreover, high construction costs (mainly due to drill wells) and inadequate financial supports reduce competitiveness of geoDH projects. Participants also agreed on the general disinterest of representatives of banks in supporting the

geoDH sector, whose funds are useful to finance projects led by municipalities, such as in two geoDH plants financed by private investors with loans from banks.

3.7. National workshop - Hungary (transition geoDH market), Budapest 03/12/2012

N. of Participants: 69

Speakers: Dumas P. (EGEC), Nádor A. (MAFI), Kujbus A. (Geothermal Express), Toldi O. (Ministry of National Development), Szita G. (Hungarian Geothermal Association), Kiss G. (EBRD), Dibácsi Z. (National Environmental and Energy Center), Lipták P. (Pannergy), Ádók J. (Hódmezővásárhely), Práczki P. (Vecsés)

Main issues: Hungary has many DHs installed in its territory and many decrees and acts regulates this sector. Nevertheless, most of existing plants are old and inefficient (high heat losses, lack individual heat control systems) and geothermal represents only 0,8% of total heat supply (most used heat source is natural gas), despite the country has a good potential. Price of DH heat (between supplier and end-users) is determined by the Ministry of National Development, but the pricing system is considered non-transparent and hinders new investments. As for financial, the Energy and Environment Operational Programme offers useful funding schemes and the EBRD (European Bank for Reconstruction and Development) finances large scale projects, while the newly launched grants of the European Economic Association support the national geothermal sector from 2013. Nevertheless questionnaires evidenced the lack of adequate municipal resources to invest and the need to promote more economic measures. In addition bureaucracy and high costs of the drilling phase make this heat source for DHs less competitive than natural gas.

Best practice examples: in order to implement part of the Hungarian Energy Strategy, the National District Heating Action Plan is going to be launched as the main national policy framework for DHs, providing a DH-oriented geothermal potential assessment. In this regard about 100 DHs (400MWt) are planned at national level by the next 10 years, whereas new geoDHs are not yet considered at regional and local level.

3.8. National workshop - Denmark (transition geoDH market), Copenhagen 06/02/2013

N. of Participants: 43

Speakers: Hofmeister M. (DEDC), Berg Lorenzen S. (DFG), Skov-Spilling J. (The Danish Energy Agency), Foged M. (HOFOR), Kamal N. (Farum Fjernvarme A.m.b.a), van Naerssen R. (The Danish Energy Agency)

Organisational constraints: 6 questionnaires were collected from DH and geothermal companies, while none was collected from the other two categories of key actors.

Main issues: Denmark has a great interest in developing geothermal projects, however legal issues are the major identified obstacles to the Danish geoDHs development. Indeed, many and complex approval stages are required to develop a project (e.g. applicants must demonstrate solid financial foundations and electrical GSHP and DH plants must supply heat and electricity) and rules are sometimes considered inadequate and poorly known by operators. This entails a complex and long lasting authorization phase for geothermal facilities (approximately 5-6 years to establish an infrastructure). Other barriers which reduce the competitiveness of geothermal compared to other heat sources for DH are identified as: lack of reliable data about the underground and quality of geothermal resources, lack of qualified personnel, high risks for the capital intensive drilling phase and high CAPEX and OPEX needed for surface infrastructures (the average payback period for geoDH projects reported in questionnaires is around 30 years). Participants also agreed that results of environmental screenings could be useful for public acceptance.

3.9. National workshop - Slovenia (transition geoDH market), Beltinci 13/03/2013

N. of Participants: 47.

Speakers: Poredoš A. (SDDE), Angelino L. (EGEC), Kraljič M. (Nafta Geoterm), Čuš I., Pospiš Perpar B. (Eltec Petrol)

Organisational constraints: no ESCO and financial institution completed the questionnaires and only 1 questionnaire was collected from Public Authorities (local development agency).

Main issues: according to the workshop and the collected questionnaires, the following obstacles to the Slovenian geoDH market can be identified: administrative barriers (mainly to obtain licenses), discrepancies between national and local regulations, high construction and drilling costs and lack of enough financial supports. Other identified obstacles are: partial lack of adequate professionals and relative closure of the sector for new companies.

3.10. National workshop - Poland (transition geoDH market), Krakow 19/03/2013

N. of Participants: 54 (8 of them were GeoDH partners).

Speakers: Angelino L. (EGEC), Wnuk R. (National Energy Conservation Agency), Hajto M. (AGH-UST), Bujakowski W. (PAS MEERI), Pająk L. (PAS MEERI), Turalska M. (Ministry of Economy), Bociek Z. (Polish Geothermal Society), Kępińska B. (PAS MEERI), Ślimak C. (PEC Geotermia Podhalańska SA), Marek Balcer (Geotermia Mazowiecka SA), Tomaszewska B. (MEERI PAS)

Main issues: despite the good geothermal potential for heating and cooling uses, the Polish geoDH market is very static, mainly due to a lack of proper interest, inadequate policies and incomplete set of state law and regulatory acts related to the RES sector. Indeed, both the new RES law draft and the NREAP by 2020 do not properly take into account support measures for RES heat generation/sale. Main RES legal and financial acts and the new Geological and Mining Law (also resulted from the involvement of policy makers in some activities of the GTR-H project) concern geoDH sector at a national level, while regional and local acts do not yet exist. Main financial barriers were identified as: lack of an insurance scheme covering the capital intensive drilling phase (this may really hinder geoDH projects), lack of specific public financial support (despite the few current subsidies and low rate loans have had a positive effect), compulsory purchase does not exist and landowners may apply any amount to sale the land involved by the work. Other identified barriers are: poor knowledge and awareness of decision makers and politicians, state institutions do not cooperate, poor interest of ESCOs and DH companies and scaling and corrosion problem in geoDH systems.

3.11. National workshop - Czech Republic (transition geoDH market), Litomerice 25/03/2013

N. of Participants: 26

Speakers: Chlupac L. (Municipality of Litomerice), Tým A. (Municipality of Litomerice), Angelino L. (EGEC), Jiráková H. (GEOMEDIA Ltd.), Stibitz M. (GEOMEDIA Ltd.), Safanda J. (Geophysical Institute of the ASCR), Kodis K. (Hennlich Ltd.), Stibitz M. (Ministry of Industry and Trade)

Organizational constraints: no questionnaires were collected from DH and geothermal companies, only 2 from ESCOs and financial institutions and 1 from Public Authorities

Main issues: compared to other RESs, the Czech DH sector suffers from the absence of lobbying activities. In addition decision makers have low awareness about geothermal systems, despite a good geothermal potential exists for H-C purposes. This implies limited investments, limited availability of public support resources and the lack of public-private cooperation. The lack of measures concerning geoDH in national RES legislation, involves inadequate regulations and guidance focusing on the delineation of geothermal resource protection zones (mainly required during the drilling phase) and inappropriate conditions for the technology development. Indeed, collected questionnaires showed that current economic incentives are inadequate to support the capital intensive investments required in a geoDH project (mostly needed for the drilling phase), despite they have had a positive effect. About financial institutions, bank representatives confirmed their interest in geoDH projects, but highlighted a mistrust, mostly due to technical issues and needs of guarantees from developers.

Best practice example: the Litomerice geothermal project (large and capital intensive) is being funded dividing financing into more phases, whose main categories are referred to scientific research and commercial application.

3.12. National workshop - Italy (mature geoDH market), Piancastagnaio 11/12/2012

N. of Participants: 31

Speakers: Angelino L. (EGEC), Varet J. (BRGM), Piemonte C. (SINTEA), Boissavy C. (AFPG), Ferraresi F. (HERA/AIRU), Amidei R. (GES), Giuntini M. (Municipality of Montieri), Martignoni L. (Municipality of Pomarance), Verdi R. (Municipality of Santa Fiora), Sbrana A. (University of Pisa), Marino V. (Politecnico of Torino), Nati C. (GES), Rizzi F. (Sant'Anna Superior School), Torsello L. (CoSviG/EnerGea)

Organizational constraints: no ESCOs and financial institutions attended the workshop, although banks and ESCOs were invited. None of this key actor category completed the questionnaires.

Main issues: compared to other RES, the Italian DH sector has no lobbying activities, entailing a reduction in investments and public resources and the lack of adequate national policies concerning geoDHs. This results in iniquity of the current regulatory apparatus, in the near absence of geoDHs in planning instruments and in the lack of support measures for technological research. Participants agreed on the need of reducing installation costs and tariffs for customers, in order to increase competitiveness of geoDHs. This could be achievable through: more incentives for geoDH projects (as the current ones are inadequate), mining risk coverage, breakdown of demand by size and kind and energy systems integrating locally available RES and energy efficiency measures. Designers also stated difficulties in defining tariffs of transferred geothermal heat between producers and network operators. Main debated technical barriers were: poor knowledge of BATs, the lack of specific solutions for geoDHs, the inefficiency of surface facilities and financial issues about networks in sparsely populated and scattered urban settlements, but with high geothermal potential.

Best practice examples: in a Tuscan geoDH plant, the implementation of more efficient technical solutions and a diversified heat consumption (residential and productive activities) allow more availability of economic resources and thus more fairness in providing the service. In France, the doublet scheme for wells allows the total re-injection of fluids and an higher concentration of wells per unit area.

3.13. National workshop - France (mature geoDH market), Bordeaux 27/03/2013

N. of Participants: 75

Speakers: Boissavy C. (AFPG), Antics M. (EGEC), Jamet P. (Dalkia), Monneyron N. (Cofely), Perrin G. (ADEME), Michels J. (Regional Council of Aquitaine), Lautrette H. (Burgeap), Andres M. (SEMHACH), Mazeau G. (Gaz de Bordeaux), Socodiabehere T. (Municipality of Mont de Marsan)

Main issues: in France a regulatory framework for geoDHs exists and, although it is sometimes considered as too complicated, it is generally considered as appropriate. Moreover, a reform of the Mining Code is being carried out with the participation of AFPG, in order to strengthen the position of geothermal energy and to determine a simplified framework for low enthalpy geothermal. Concerning financial, despite France has financial support tools and a mining risk insurance, high construction and drilling costs may hinder and reduce the competitiveness of geothermal projects. In addition, collected questionnaires pointed out the lack of deep geothermal resources characterisation, resolvable through: the identification of adequate capitals within the Renewable Heat Fund and increasing public funds for scientific supports.

Best practice examples: the City of Bordeaux and the Urban Community of Bordeaux are aiming to increase the heat production from geothermal energy, designating a municipal coordinator especially dedicated to geothermal energy, issuing new permits for deep drilling, re-evaluating existing wells, re-activating licenses for existing geoDHs and planning geoDHs for new urban areas. The Aquitaine Region co-finances geothermal projects eligible to the Renewable Heat Fund and it is setting up an innovative financial support scheme to promote renewables through “subsidized loans”, as a result of the agreement between the European Bank of Investments and regional banks. France has also an insurance scheme (80% of the investment for the first well), covering both geological risk and the doublet lifetime.

3.14. National workshop - Germany (mature geoDH market), Offenburg 19/02/2014

N. of Participants: 13

Speakers: UBeG GbR, Projektträger Jülich (PTJ-EEN), Forschungszentrum Jülich GmbH, COSVIG, IGO Internationales Büro der deutschen Geothermie, EnergieAgentur.NRW, Badenova AG & Co KG, EGEC, Erdwerk, WFG/GtV_BV, Helmholtz-Zentrum für Umweltforschung UFZ, WFG/GtV_BV

Main issues: in Germany a regulatory framework for geoDHs exists and, although it is sometimes considered as too complicated, it is generally considered as appropriate. Main issues relate to environmental impact and discussion about micro-seismicity and fracking. Concerning financial, despite Germany has financial support tools and a mining risk insurance, high construction and drilling costs may hinder and reduce the competitiveness of geothermal projects. In addition, stop and go policies on renewable heat are a big problem.

Best practice examples: the example of Unteraching was given. The metropolitan area of Munich has a very high density of geothermal heat or heat and power plants. A junction of all these heating networks seems to be possible. The heat supply by geothermal energy can be raised by drilling further wells in the existing exploitation claims. Combined heat and power plants can be installed in claims with thermal water temperatures > 100° C for supplying base-load electrical energy too. The area of Munich is best prepared for the heat supply with renewable energies esp. CO₂ – free geothermal energy. To reach the 100% goal for renewable heat in 2040 is a realizable vision.

Conclusions

During the 14 national workshops, active participation and satisfaction were observed among the participants, despite in three of the five workshops held in countries with juvenile geoDH markets, the attendance was rather lower than expected, with less than 30 participants. If this prove great interest in project objectives by stakeholders and administrations involved in geoDH projects, it might also mean difficulties in attracting interest in countries where the use of geothermal heat and DH are neither considered as strategic, nor included in NREAPs. Another organizational weakness observed was the overall low interest and involvement of ESCOs and other financial institutions. Indeed, questionnaires collected from this category of key actors were averagely lower than those collected from the other categories and in Italy none of them attended the national workshop, although many invitations were sent in advance.

All project countries have a good geothermal potential to develop DHs, but often detailed information are missing. Nevertheless, whereas other renewables (as well as traditional energy sources) have strong lobbying activities, geoDH sector does not and this results often in a lack or inadequacy of the current energy policies and in unfair distribution of economic incentives for geoDHs, which cause the main obstacles to the national geoDH markets. Indeed, National District Heating Action Plan is going to be launched only in Hungary, while many countries do not properly include geoDH in respective NREAPs, as they often refer only to RES heat. At local level, this is reflected in the frequent lack of inclusion of geoDH in local planning instruments.

National workshops showed that the inadequacy or absence of policies supporting DH and geoDH mainly entail:

- Lack of awareness among decision makers
- Lack of a specific legislative framework concerning geoDH, or DH and geothermal energy;
- Negative synergies between overlapping acts and laws concerning DH or geoDH (mainly due to the lack of communication among public authorities at different levels);
- Insufficient incentives in supporting geoDH and more generally DH, that very often do not adequately support the capital intensive investments required to build a geoDH plant.

All this leads to uncertainties during the authorizations and permits issuance phases, which slowdown time needed to develop a geothermal DH project. Moreover, the high CAPEX required for a geoDH project, mainly due to the drilling phase, which involves high risks (covered by insurance only in France and the Netherlands), are resulting in uncertainties and mistrust among project financiers, which need more guarantees, clear pay back periods and further details about the operational life and management costs of plants.

As far as technical issues, countries with juvenile geoDH markets proved major obstacles. However, more generally, main identified technical barriers are referred to:

- Low knowledge of best available technologies;
- Lack of experts and trained staff;
- Lack of specific technologies for geoDH;
- Need to develop DH networks also for lower temperatures;
- Inadequacy of old DH networks (in Hungary and Bulgaria it causes mistrust among end users).

After the 14 GeoDH national workshops, the Irish geothermal DH market seems to have the greatest need of support actions, since there is not experience and main Irish strategic documents have no clear policy objectives for both DH and geothermal heat.

Further concerns should be taken into account about the importance to better attract and involve ESCOs and financial institutions like banks, in order to create more financial possibilities to geothermal DH projects.



As regards suggestions, a reduction of CAPEX and OPEX is of primary importance to increase the competitiveness of this technology into the heat market. Indeed, reducing costs could mean lower fees for end users, increasing of demand and possibilities to establish off-take agreements for heat supply, so as to reassure project financiers. According to results of debates held in national workshops, main proposals to decrease costs are the following:

- Breakdown of financing into more phases, such as geothermal and DH networks, or scientific research and commercial applications;
- Development and support to public-private partnership, both in financing a project and in managing the networks;
- Breakdown of demand by size and kind (which would reduce management costs);
- Combination of a geoDH with energy efficiency measures, so as to reduce the heat demand;
- Integration of geothermal with locally available heat sources;
- Incentives to R&D in new specific and cheaper technologies, for geothermal DH and to develop networks that use low temperatures;
- Incentives to better assess the geothermal potential;
- Promotion of insurances or guarantee funds, in order to reduce the mining risk;
- The establishment of a National District Heating Action Plan;
- Greater involvement of financial institutions, for example through agreements with local authorities;

Concluding, the new directive 2012/27/EU on energy efficiency offers an opportunity to Member States to provide a policy framework for DHC. Article 14 provides that each country shall assess its potential for high efficiency cogeneration and efficient DHC by December 2015 and shall undertake a cost-benefit analysis of such potential, taking into account the potential development of local and regional heat markets. When the potential for efficient DHC is identified and the benefits exceed costs, Member States will have to undertake adequate measures to implement their achievement.



ANNEX 1: National Workshop Reports

United Kingdom:

Minutes

Promote Geothermal District Heating Systems in Europe

National Workshop – United Kingdom

15th October 2012

Venue: The Geological Society, Burlington House, Piccadilly, London W1J 0BG, UK

9.30 – 9.45 Registration & Opening by the moderator of the day: B Sanner (EGEC)

Presentation of the objectives of the workshop
Introductory round by all participants

9.45 – 10.00 GeoDH project overview: P Dumas (EGEC)
10.00 – 10.15 GeoDH national potential: methodology: A Nador (MFGI)
10.15 – 10.30 Prospective for geothermal DH in Europe: R Pasquali (Geoserv)
10.30 – 10.45 GeoDH potential in UK: T Jackson (SKM)
10.45 – 11.00 Case Study: Southampton geothermal DH: M Smith (COFELY DISTRICT ENERGY)

All presentations are online > www.geodh.eu

Discussion on Southampton geODH system:

Heat losses of DH = 1°C per Km

Cofely intends to develop more GeoDH of energy prices continue to rise

No reinjection in the Southampton project, sustainability for ensuring the lifetime seems OK.

Model: Scheme is owned by Cofely to de-risk the project for the local authority

Profits are shared between Cofely and the City Council

Governance arrangements where Council can influence decisions

11.00 – 11.15 Coffee Break

11.15 – 11.45 Roundtable and Discussion on the regulatory barriers

Important questions:

- Is enough information on geothermal resource available ?
- Licensing procedures
- Dedicated geothermal framework
- Administrative procedure, n° of layers
- DH and geothermal policy

The information on the geothermal resource and its potential is unequal between local authorities.

Discussion focused on licensing:

- The Environmental agency explained that no protection exists on the heat content of the geothermal resource for the developers. The license is on the abstraction/re-injection of water. Only a private agreement could protect the developers about its area.
- Little protection for the investor is currently available under the current framework
- Mining & Hydrocarbons legislation does not take heat into account (UK or Scotland): public ownership of the resource, and developers pay royalties for using it
- It seems enough for the moment as few projects are currently developed but a licensing scheme will be needed in the future to facilitate investment and decrease project development risk and facilitate the administrative process – This is currently not a priority at government level
- The example of the water abstraction and re-injection for geothermal in the London Area was cited as perhaps representing why the current licensing system may not be fit for purpose.
- Protection for production and reinjection wells? Yes, see modeling of Paris Basin to avoid interferences – Information similar to that used for the Austrian / German border projects
- Example Hungary: a new mining law for establishing a protection zone to geothermal developers (A Nador to provide some clauses translated into English)
- Where minewaters are being used (or in areas where mining has occurred), the coal Authority is in charge of managing part of the application
- Several agencies have to work together. Local authorities have to define the environmental strategy submitted to public examination. When local planning, need evidence on geothermal. After examination, control of application procedures.
- Manchester city council: enough information about the potential but not about the application process- detailed information and planning guidance documents for local authorities are required.
- What role for local authorities / Central government ? It's difficult to deal with DH. Which role ? needs to share learning and a clearer focus from central government of DH and GT– geoDH should be part of the core strategy at central government and the local authority role key to the implementation of DECC's Heat Strategy, hence this relationship (an example of this is in Germany where DH is dealt by local authority and geothermal developments through central government)
- Local authorities should push people to connect to DH
- Public acceptance / perception : before, during and..after – Notification of relevant stakeholders is essential to geoDH project development, a model similar to local authority liaison groups in Cornwall could be used
- Fracking issue: not for traditional geoDH. In the future with EGS, needs to distinguish fracking for shale gas using chemicals, at shallow depth, aiming at connecting all reservoirs and stimulation for EGS at deep depth where wells must be secure to avoid any leakage of water...and temperature
- Induced Seismicity monitoring should be base on surface ground motion thresholds rather than magnitude of events as currently proposed for shale gas
- A Need to train local authorities using peer-to-peer learning networks (Heat Network Group) on geoDH: planning officers was highlighted. DH Association already proposes courses on pre-feasibility-feasibility-procedures. A
- Good Practice Guidance document 377 on DH was highlighted as requiring revision and modernization with a detailed procurement/feasibility and completion guidelines.
- Reduction of the administrative process associated with the development of DHN needs to be addresses (post-feasibility procurement process of 40 weeks should be reduced)
- DH networks are still mainly considered for higher temperature systems and deep GT with inadequate infrastructure being considered and promoted for shallow geothermal systems

- Clarity on procurement issues for heat in anchor loads of DHN such as public sector buildings need to be addressed
- A framework of DH infrastructure development to reduce administrative burden and facilitate the organic growth of individual schemes (addressing blue-chip) customers should be facilitated as this represents a realistic starting point for introducing DHN and facilitating future growth

To conclude, BGS mentions the Netherlands as a best practice example:

- A solid legal frame, notably protection on resource ownership
- A risk insurance scheme
- A feed-in tariff

11.45 – 12.30 Roundtable and Discussion on the financial barriers

- Experience of RHI: a guaranteed income for 20 years
 - Consultation on the depth eligible: 500 m ?
 - Objective to de-risk the project
 - Financing from public Budget
 - Needs a preliminary registration to secure the tariff for a project
 - Spending taken into account from operation
 - GT Currently considered as a long lead in time technology
 - Applicability of RHI in a heating & cooling scenario for GSHP -discussion
- Capital intensive: exploration, drilling, installation geothermal + DH scheme
- Low operational costs
- Needs more investment
- Insurance scheme to cover the geological risk of geothermal projects
- Barclays bank: project financing. Needs guarantee from developers. Replicate and scale-up projects – investment approach rolled out over several projects
- Novus Modus: invest in project developers. Project equity. Issue: amount of capital and risk
- Turquoise: finance after the first well is drilled. Needs to see capital costs / operational costs / lifetime
- Private developers risk on temperature and permeability
- EGEC working on a European Geothermal Insurance Scheme – end of 2012

12.30 - 13.00 Conclusions of the day and next steps

Several reports to be published in 2013

In 2014: a training course, a site visit, a promotional seminar – details of dates and venue TBC

Bulgaria:

D.3. 1 Reports National Workshops – Bulgaria

In the framework of the project "Promote Geothermal District Heating Systems in Europe - GEODH" on February 20 took place a regional workshop with representatives of stakeholders. The meeting was organized by the Association of the Bulgarian Black Sea Authorities (UBBSLA), the Bulgarian partner of the project. Coordinator of the project is the European Geothermal Energy Council - Brussels, Belgium. The meeting was attended by 28 participants, representatives of companies installers, planners, geologists, representatives of the municipality of Varna, a representative of the Association of district heating companies in Bulgaria, energy agencies and others.

The meeting was opened by Mr. Dobromir Djikov, municipal councilor in Varna Municipal Council.

The purpose of the meeting was to stimulate discussion about the problems facing the possibilities for using geothermal energy for district heating.

The first presentation was at Luca Angelino (EGEC), who presented the European policy concerning the development of the sector. He presented the adopted directives and objectives which the EU has set itself. He also noted the some good examples and practices from other European countries.

The next presenter was Todor Tonev, he presented the objectives of Bulgaria and the assumed commitments, as well as geothermal potential in Bulgaria and stressed the potential in the Black Sea region.

Bulgaria is committed to reach a share of renewable energy sources (RES) of 16% by 2020 to achieve this purpose, the Ministry of Economy, Energy and Tourism (MEET) has developed a National Action Plan for Renewable Energy in accordance with Directive 2009 / 28. Target set for Bulgaria 16% share of renewable energy in gross final energy consumption in 2020 includes the following titles of such sources in the relevant subsectors - 20,8% of electricity 23.8% of the energy for heating and cooling and 10.8% in transport. With respect to the estimated total contribution of each technology for heat and cooling from renewable energy sources is expected in 2020 total energy output amount to 1 103 kilotonnes of oil equivalent (ktoe) by utilization of biomass, geothermal and solar energy.

At the moment the the use of a geothermal energy for heating is very limited. According to data reported by the Ministry of Environment and Water on 1 July 2010, which exploitation resource is estimated at 1979,99 l / s, of which 1415,19 l / s (71,47%) is a free resource. During the last 5 years, the quantity of thermal water has increased slightly - from 25 to 28%. The territory of Bulgaria is rich in mineral waters with temperatures ranging from 20 ° C to 100 ° C. The water temperature is not higher than 50 ° C for about 72% of the resource discovery of localities state property (Figure 1 a), and the flow rate varies between 1 and 20 l / s of 75%, (Fig. 1 b). The total dynamic resource is about 4600 l / s, (Petrov and others., 1998).

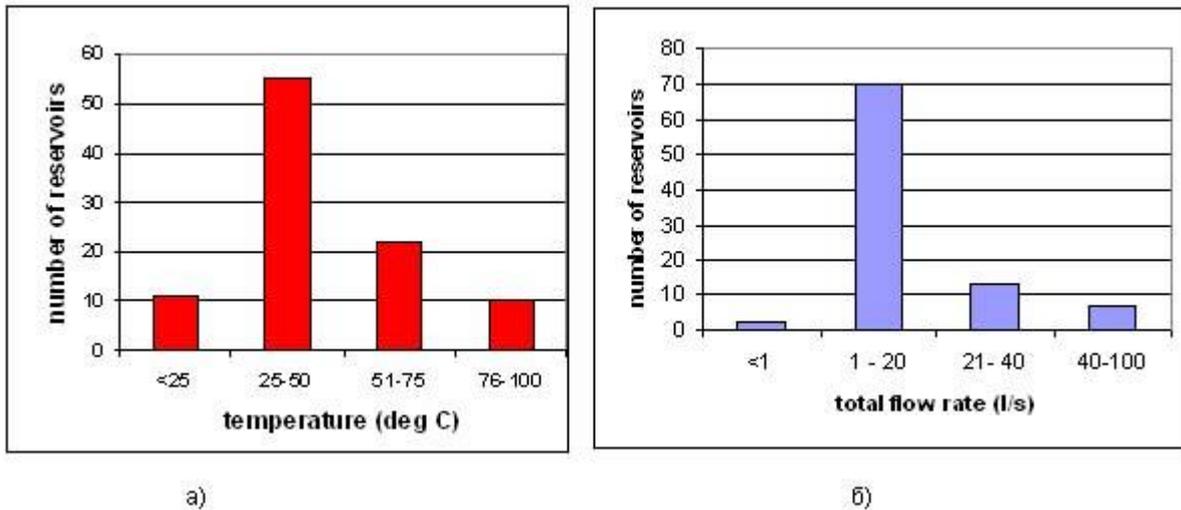


Fig.1. Allocation of the deposits of thermal waters state property concerning the temperature and water flow

The highest water temperature (98 ° C) was measured in Sapareva bathroom (Yu.Balgariya), while the largest water volumes are concentrated in northeastern Bulgaria.

Generally in the region of Southern Bulgaria revealed a high temperature fields and higher water volumes compared to the northern part of Table 1, (Bojadgieva et al., 2010). Concerning the use of flow, however, the readings in North Bulgaria are 20.5% of the resource discovery, while in South Bulgaria are lower - 14.5% Figure 2.

Region	Water temperature	Total flow	Used flow	Total mineralization
	°C	l/s	l/s	g/l
North BG	20-70	1241,65	254,7	0,1- (100- 150)
South BG	20-98	1823,81	263,5	0,1 – (1-15)

Table 1

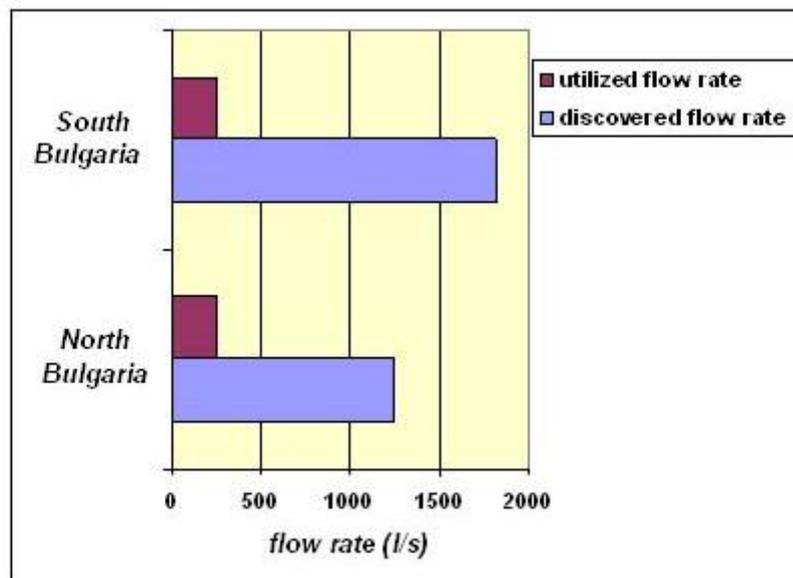


Fig.2. Detected and used thermal water amounts in northern and southern Bulgaria

From the data provided it becomes clear that there was a significant geothermal resource is not being used. According to information provided by Luca Angelino, a representative of the European Geothermal Energy Council, currently there is a growth in the development of geothermal District heating plants in Europe. At present, are in operation 216 geothermal heating systems with a total installed capacity of 4 900MW. 2015 will be put into operation 170 new geothermal district heating systems with a total installed capacity of 4 000MW.

The reason for the increased interest in such renewable energy source is permanently growing energy prices and a high dependency on oil-producing countries. As a major advantage of geothermal energy is that it is the price of a local source which depends only on the charges set at the state level. However, that creates a high degree of risk because over the last ten years, the price for 1 m³ has changed from 0.02 to 2.00 lev investment in geothermal district heating is a long-term horizon and the minimum is 25 years.

National legislation of Bulgaria is synchronized with the European policy for promoting the use of local energy sources. The necessary administrative steps for the use of geothermal energy were presented by Dipl. Eng. Stoyanka Valcheva from Basin directorate Black sea region. From presentations clarify to a great extent procedure referred to providing the use geothermal sources for energy needs. The presentation was very useful for the present. It turned out that communication between Basin and installers have lacked until now. Much of the installers were surprised that the available administrative procedure for giving a source of geothermal energy use for energy needs.

The use of geothermal energy in Bulgaria has started more than 25 years during the communist period in Bulgaria. In this time was developed capacity for construction and operation of geothermal energy. Also they constructed some buildings with central heating in Varna and resorts near to the town. But after 1989, this initiative was abandoned and now only those buildings use geothermal energy for heating. Historical development and current use of geothermal energy was delivered by Prof. Dimitar Russev TU Varna.

In the discussion after the presentation Mr. Deyan Yordanov representative of "Argus 91" Ltd said that his company is the main consultant on the design of a geothermal heating system Hospital "St. Marina". It was also noted that the technical and design potential exists, but is available at project designers diffidence due to lack of practical experience in the design of such systems. As the most important obstacle to the development of geothermal district heating was determined price that consumers are willing to pay for the service supplied. At the moment the in Varna district heating about 13% of households, the rest is self-heated by electricity, wood, coal and others. There is a tendency for the outflow of users of the DH, although direct comparison of the cost per kWh is the lowest price is for DH.

The causes for this are complex, in general are:

- out of date infrastructure of internal heating system in flats, that realized losses;
- internal heating systems are with vertical distribution which making impossible individual metering of consumed from each apartment energy;
- some users using smaller energy for the apartments and want to heat only one or two rooms, which is inefficient and actually they makes DH more expensive than air conditioning.

For the above reasons, district heating has a bad image to the public and citizens prefer in most cases to be independent from this type of service.

The reason for the low price of heating is hidden subsidizing heating companies by the price of electricity they sell because they are equipped with a CHP plant.

On the other hand, the use of geothermal energy for centralized district heating is based on the utilization of local energy source that guarantees stability and predictability in the price of the service. It is also possible to apply for and secure external funding for investment for the installation. The development of geothermal district heating should be handled in two ways:



- providing investment financing from banks, financial institutions and other EU funds.;
- awareness campaigns on the benefits of using geothermal district heating;

The meeting was closed by Todor Tonev.

The Netherlands

Heerlen

Report

Kenmerk

Aan

Bijlage(n)

Date/time /place

3 april 2013, 9.30 uur uur, De Hoeve Eijckholt, Nieuw Eijckholt 300, Heerlen

Elianne Demollin
Center of Expertise NEBER
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Subject

Workshop juridische barrières aanleg warmte/koude-netten
met geothermische bronnen

Within the scope on the IEE project GEODH a national workshop on Legal barriers was organized on 3 April 2013 in Heerlen, the Netherlands. This report will elaborate the results of the presentations and the discussion. In total 28 persons visited the workshop. A list of attendees is enclosed as annex. People of businesses, universities and knowledge institutions visited the workshop.

The group participants were welcomed by mrs. Riet de Wit, alderman of Heerlen council and governmental responsible for the Minewater project in Heerlen. There were 5 presentations held. First mr. Burkhard Sanner introduced the EU-project GEODH. This presentation was followed by mr. Frank Schoof, who represented mr. Viktor van Heekeren as chairman of the Dutch geothermal platform. Mr. Schoof explained more about the Dutch situation with regard to permits, both exploration and exploitation permits for geothermal projects. Mrs. Helma Kip followed with an introduction with respect to legal constraints on several levels in the Netherlands. Mrs. Kip substituted mr. Gijs de Man, who is chairman of the Dutch heat network organization. After the break, 2 presentations were held. First an introduction was held by mr. Guido Bakema, chairman of the Dutch organization for subsurface energy storage. And finally mr. Louis Hiddes closed with a lively presentation of the Minewater project 2.0 of Heerlen Council.

The workshop closed with a field excursion; several locations of the Minewater project were visited, where the infrastructure with its new investments were elaborated by the process technologist of the project.

From the presentations it shows that the status quo in the Netherlands in 2013 is that there are 9 deep wells/doublets in the Netherlands with a capacity of 40 MWh (end of 2012) and 720 GJ per year (counted in 2013). There are about 100 license applications provided. Furthermore the Dutch geothermal platform drafted an action plan for Geothermal energy with a goal of 11 to 14 PJ in 2020. However this is not part of the Dutch NREAP.

A positive development on central governmental level is the guarantee scheme for exploration risks and the **feed-inn tariff SDE+** which had a budget of € 800 mln in 2012. However this is under discussion, due to the wind lobby in the Netherlands.

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The last signals are not positive for the geothermal sector. The proposal is that there will be a reduction of 40% for large projects. Furthermore there will be increased safety focus which will affect smaller projects.

The Dutch geothermal platform observes a **legal constraint in the combination of different laws that cover geothermal energy**. Permits, under these different laws can influence each other in a negative way like the **Mining Act** and the **General Environment Conditions Act**.

The Dutch association of subsurface energy storage points out four Acts which are correlated with the subject of district heating/cooling infrastructure. First the **Heat Act** is elaborated. The Heat Act is already 10 years old, but was never really started since there is a Order in Council required. In the meantime for every project a discussion is started with regard to rates. Since this correlates with the investment possibilities of projects, the realization of district heating and cooling infrastructure is directly connected to the results of these negotiations.

In the beginning of 2013 the Senate approved a proposal and the expectation is that it will come into force in January 2014. This Act however only regulates rates of GJ heat and not for cooling. For cooling, though, a report is required, but it is not covered legally.

The basis for the fares is the natural gas principle. This means that the heat price is based on **'not more than otherwise'** in the case of heating with natural gas.

For heat/cooling exploitation a control by the regulator is built into the law, in which the profit on the investment is allowed with a maximum of 5,0-7,1%, after tax.

The heating and cooling infrastructure is not covered by law in the Netherlands, whereas for electricity and gas there are regulations.

The several aspects that come along with infrastructure are laid down in several Acts in a disintegrated way. For example, the situation that the rates are covered by the Heat Act, whereas a possible forced connection to a heating and cooling infrastructure is covered under the **Building Act** is illogical. To establish a forced connection, a local government has to fulfill a long and heavy procedure to realize a local Heat Plan, before they can force developers to connect to the infrastructure. Since a procedure is surrounded by many political and strategic considerations, politicians are not always keen on establishing a local Heat Plan.

A heat plan includes a designation of specific district heating areas and clear formulated environmental criteria (in energy efficiency, green house gas emission reduction, etc) on which building permits will be granted or refused including the proposed energy infrastructure.

The **Building Act** in the Netherlands prescribes that, to receive a building permit it is obliged to have a natural gas connection. This is an obligation to connect but no obligation to purchase and use natural gas. However in most cases, installation companies are used to a way of working and advise persons to use natural gas. Since there is much natural gas available in the Netherlands, the industry of conversion technology is strongly embedded. Both the gas and conversion industry have an interest in the sale of natural gas and boilers. With a declaration of

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equivalence the obliged gas connection can be omitted, but then a substitute for heating must be available.

The energy performance coefficient under the Building Act is based on the Energy Performance Directive for Buildings (EPBD). There is a calculation method to calculate the legally required coefficient.

Three important issues popped up during the meeting. One is that this is only required for new buildings. Renovation is excluded. Another issue is that the valuation of heat in the energy performance coefficient is not equal to other fossil fuel options. If the valuation of heat would improve this would lead to more opportunities in the present built environment.

Third issue is that the energy performance coefficient for areas is not optimized with regard to the calculation of the energy performance of a building. This means that area measurements do not have a positive effect in the calculation of the energy performance of buildings, when they are present.

Under **the Landlords and Tenants Act** housing associations may not increase the rent in the event less than 70% of the inhabitants of a block allow this increase. In most cases investment space must be created to realize district heating and cooling infrastructure. This obligation is a constraint for district heating and cooling projects in existing neighborhoods.

The **energy label** issue in the Netherlands is a debatable issue. The Dutch government did not force the use of the label. But with respect to the content, for new buildings, district heating is valued in the energy efficiency calculations of buildings under the Building Act (energy performance coefficient). For existing buildings, however, the energy label ignores (fossil) energy saving measures like district heating. The lack of progress and hefty debate on this issue clearly demonstrates the 'perceived' opposing interests of various municipalities and heat companies on the one side and the building sector and housing associations on the other side.

For the presentations a quick scan was made of the **2012/27/EU on energy efficiency** for the Dutch national legislation. The directive needs to be implemented into the national legislation by mid 2014. Relevant issues for district heating and cooling infrastructure are:

- Smart meter implementation
- Option to oblige electricity production to use heat
- Option to oblige network operators or suppliers to save energy
- CHP and heat planning

In the event local authorities plan to make heat plans, indicating in each region what the preferred heat source is, and so they provide opportunities for district heating. The implementation of this directive is an opportunity to provide a policy framework for district heating and cooling.

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With respect to **cooling** a conclusion is that legislation is missing in the Netherlands.

On the private law side it is discussed that in the event district heating and cooling infrastructure leads to decrease in value of soil. In most cases hereditary tenure must be realized.

The group experienced the workshop as positive and constructive. After the discussion an excursion was held to the Minewater project.



Ireland (and Northern Ireland):

REPORT

GEODH PROJECT – IRISH WORKSHOP

Date: 9th April 2013

Place: Dublin (Geological Survey of Ireland, Beggars Bush, Haddington Road Dublin 4)

Participants: 22 (see Annex)

Summary of the workshop

The Irish GeoDH workshop was held in Dublin, on 9th April 2013. It covered both Ireland and Northern Ireland and was attended by representatives of:

- Local authorities (Meath County Council, Cork City Council, Antrim Borough Council, Limerick City Council, Ballymena Borough Council);
- Public bodies (e.g. SEAI, Geological Survey of Ireland, Geological Survey of Northern Ireland);
- Financial institutions, e.g. BNY Mellon;
- Companies, engineering companies and consultants operating in the field of geothermal energy and district heating (Origen, Killarney Renewables, SLR Consulting, RPS, ARUP)
- Law firms (Matheson, LK Shields).

The absence of some local authorities which had previously shown an interest in the project was the only weakness observed. Notwithstanding, participation was very active and the formidable challenges of the Irish case have clearly emerged since the beginning.

Background

Ireland has neither district heating (DH) nor deep geothermal tradition. Whilst the first DH is currently planned in Dublin, the main barriers to the development of geothermal appear to be the very poor knowledge of the underground resources as well as the lack of a clear government strategy to develop this technology.

In its national renewable energy action plan, Ireland does not put any figure on deep geothermal heating and cooling, and does not propose any support measure. Additionally, despite a public consultation run between 2008 and 2009, heavily influenced by the work and results of the GTRH project, a regulatory framework for geothermal energy in Ireland is still absent. However, local initiatives make reference to GeoDH in counties Cork, Waterford, Meath & in the Boroughs of Ballymena and Antrim in Northern Ireland. The DHN proposed in Dublin as part of the Dublin City Council's SEAP, which makes reference to geothermal energy resources but does not clearly define the use or contributions of these to the proposed district heating scheme. .

Project Overview and Geothermal potential in Ireland

After the welcome-speech by Nick O'NEILL (SLR), Luca ANGELINO (EGEC) gave an overview on the GeoDH project. This was followed by a presentation by Riccardo PASQUALI (GeoServ-

EGEC) summarising the developments of the project's web-map tool aimed at matching the geothermal potential with the heat demand in the targeted countries. In this context, the available sub-surface temperature data from Ireland (SEAI Atlas, 2004) was presented.

David MCAULEY (Sustainable Energy Authority of Ireland – SEAI) made clear that whilst no national R&D funds were allocated to geothermal from 2004 to 2010, the objective now is to develop a strategic and holistic understanding of Ireland's geothermal energy potential through integrated modelling of new and existing geophysical and geological data. This is the aim of the IRETherm project, a four-and-a-half year academic-government-industry collaborative project funded by Science Foundation Ireland.

Case Study: The Dublin DH Project

Ciaran MILLER (RPS Group) provided an overview of the Dublin District Heating scheme at Spencer Dock.

The Feasibility study has been completed and technical principles have been defined. In addition, the Spencer Dock development is now District Heating enabled and some distribution pipes have been installed during 2008 and 2009. The consortium is now focusing on promoting DH among new and existing building owners and tenants in Dublin city as well as in developing a business plan.

The main barriers identified so far are the following:

- Public acceptance;
- High capital costs;
- Competition from gas fired central heating;
- Lack of government funding: distribution and connection;
- Lack of a regulatory framework for heat market;
- Lack of existing customer base – the classic chicken & egg scenario.

Barriers to GeoDH

The following barriers hindering the development of GeoDH were identified during the discussion:

Technical barriers

- Lack of wide and detailed information on geothermal energy resources & potential contributions;
- Lack of experience with DH technology;

Regulatory barriers

- Lack of legislation granting rights to explore & develop geothermal resources (Geothermal Energy Development Bill – work in progress);
- Lack of national geothermal regulatory framework;
- Lack of clear policy objectives at national and local level for DH & Geothermal in the main strategic documents. For instance, the Irish *Strategy for Renewable Energy: 2012 – 2020*, and *A Strategic Framework for Northern Ireland* fail to address the heat market. A clear policy/strategy could facilitate:

the implementation of cogeneration in DH;



the inclusion of key anchor load tenants (eg industrial or government bodies), where heat ready site are prioritised for geothermal energy projects
provide focus on cascade uses

- Lack of framework for regulating the Heat Market in Ireland;
- In this regard, the UK studies *The Future of Heating: A strategic framework for low carbon heat in the UK* and the recently released *The future of heating: Meeting the challenge* were seen as very good examples of strategic documents as they look at the 2050 horizon and identify, among other things, the heat demand foreseen in the long-term.
- Clarity on procurement legislation in Northern Ireland is required to deal with tendering and procurement for district heating
- Government policy in Northern Ireland which supports fossil fuel and gas infrastructure needs to consider geothermal energy as geographically resource tied

Financial barriers

- Risk associated to the first drilling and its coverage; Capital intensive technologies, high CAPEX and OPEX;
- Lack of off take agreement contract models for heat to secure bank funding
- Lack of dedicated support for renewable heat in Ireland;
- Support tariff for Deep Geothermal in N. Ireland is under review - RHI p.2)
- No support for DH in Ireland and N. Ireland.
- Geothermal and District heating project financing should be considered separately;
- Government investment in both technologies (esp. geothermal) is required to develop a flagship demonstration project.

Additional support for Local Authority and Private Company partnerships should be considered in the implementation of GeoDH schemes.

Other barriers

- Educational and awareness gaps - these mainly relate to public perception and understanding of both geothermal an District heating technology and the potential contribution of geothermal resources to lcoal and national heating demands
- A centralised licensing and regulatory body should be responsible for geothermal energy and district heating (this is against the current policies of decentralisation that are being implemented)

Conclusions

Ireland is a juvenile market for both deep geothermal and DH. Indeed, the lack of legislation and a regulatory framework has been identified as the main regulatory barrier. Hence, the discussion naturally focused on how to trigger the development of geothermal on the one hand, and on what can be the drivers for building DH infrastructure.



Regarding geothermal, there was a clear consensus among the audience about the main priorities in the short-term, namely:

- Improving the resource assessment; and
- Getting off the ground a first deep geothermal research project, ideally financed by the government, that can pave the way for a wider development of the technology.

As far as DH is concerned, the main drivers were identified in some of the provisions of the new Directive 2012/27/EU on energy efficiency to be transposed into national law by 5th June 2014. The most important of these provisions is no doubt the requirement for Member States to assess by December 2015 their potential for high efficiency cogeneration and efficient DH (Article 14 (2)) and to undertake a cost-benefit analysis of such a potential (Article 14(3)). When a potential for the application efficient DH is identified and the benefits exceed the costs, Member States will have to take adequate measures to accommodate their realisation (Article 14(4)).

Edited by Luca ANGELINO (EGEC) and Riccardo PASQUALI (GEOSERV – EGEC)



Romania:



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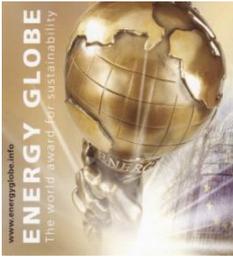
GEODH

Romanian National Workshop Report

April 16th 2013



Author: **Doina Cucueteanu**
RGS Manager



SOCIETATEA ROMANA GEOEXCHANGE

Energy Globe Award 2006 for the project "ROMANIA – a clean country for a clean EUROPE"

ENVIRONMENTAL PROTECTION AGENCY EPA – USA & DEPARTMENT OF ENERGY DOE – USA

"Geoexchange is the most energy efficient, environmentally clean, and cost-effective space conditioning systems available"

Summary

- I. Background
- II. Local authorities involved
- III. Barriers identified
- IV. Conclusions and next steps
- V. List of participants

I. Background

The Romanian national GeoDH workshop was realized by the Romanian Geoexchange Society based on the EGEN – RGS cooperation Contract signed on 13 July 2012 (Annex 1). The contract provided both technical obligations for RGS (3 support letters for Romanian local authorities, co-organization of a national workshop and a training session with EGEN's lecturers and trainers) and financial obligations for EGEN (payment of the total amount of 3000 Euro in 3 instalments (30% - at contract signature, 40% after the workshop and 30% at the end of the contract in November 2014)).

Workshop agenda

The decision of the 2 partners (EGEC and RGS) was to concatenate the 2 IEE workshops GeoDH and REGEOCITIES. The agenda of the 2 workshops was finalized 2 month before the workshop (Annex 2).

In the final version of the agenda, 2 of the 5 GeoDH presentations were made by EGEC's representatives Luca Angelino and Attila Kuibus and 3 of 5 by the Romanian partner: 1 by Transgex (Beius – Geothermal City), 1 by EBRD Romania and 1 by RGS representatives (Gavriliuc & Zeghici).



All the participants received a file containing a DVD with the PDF format of all the presentations, the agenda and other technical and financial regulatory files. After the event, all the presentations were installed in RGS site www.geoexchange.ro

Venue

The venue was the “Coloane” hall of the Technical University of Civil Engineering Bucharest – Installation Faculty. The venue maximum capacity is 70 persons around 2 conference tables (the main one and the secondary one).

The number of participants in the workshops was 53 persons. The RGS members directly involved in the workshop organization were:

- Prof. Robert Gavriluic – RGS President
- Doina Cucueteanu – Director
- Irina Mihai – Junior Assistant
- Razvan Zeghici - co-author of 2 presentations
- Gabriel Nastase – Translation
- Cristian Suciu – IT
- Radu Hanganu – Visit at functional application.

The EGEN participants were Mr. Luca Angelino and Mr. Attila Kuibus that presented 2 lectures in the GeoDH workshop. Mr. Luca Angelino also presented a lecture in the second workshop – REGEOCITIES.

II. Local authorities involved

The main local authority involved was BEIUS Municipality who cooperated with TRANSGEX Company and contributed with a very consistent and concrete presentation: “BEIUS – Geothermal City”.

At the same time, all the 3 issuers of the Romanian support letters participated at the local workshop (Bucharest District 2, Prahova County and Beius Municipality).

The total number of the local authorities that participated at the workshop is

16 from 53 participants.



III. Barriers identified

The main sources for identifying barriers were: Beius and Oradea

Municipalities, the discussions in the national workshop and GeoDH questionnaires.

RGS integrated the information from the 3 sources and concluded that the perception on the barriers is the following:

- high construction and drilling costs;
- lack of continuity and predictability in incentives area;
- low and unbalanced spreading of geothermal potential on the Romanian territory;
- low level of market demand;
- lack of enough experienced specialists.

IV. Conclusions and next steps

The participants expressed the satisfaction regarding their participation and the possibility to obtain information from reliable sources (EGEC, TRANSGEX and Beius Municipality). They are interested on the next step: GeoDH training in November 2013.

From the point of view of RGS, the conclusions are the following:

- it is very difficult to bring together people from all-around the country, the next approach should be to organize regional events;
- the questionnaires are a little too long and too complex; they tend to obtain all the important data and information from each entity (we received filled questionnaires with a lot of unanswered questions);
- the knowledge level of the participants being so different, it is difficult to capture their interest all the time. Visits on functional applications are more convincing than 1000 words.

Slovakia:

Meeting minutes, GEO-DH workshop, Bratislava, 11-10-2012

09:35 Lubos Slovak from AGEO opened the day and presented the aim of the workshop.

09:40 Luca Angelino from EGEC presented the aim of the GEODH project. He highlighted the impact of national workshops. After conclusion of the presentation, Luca was asked to list the main tools for identifying of the different barriers.

09:55 Annamaria Nador from MFGI gave an overview of WP2 and especially paid attention to the work which was done until now within the project. She presented gathering of the data from various sources concerning geothermal potential and heat demand in the Europe. Lubos asked about the homogeneity of the data from various European countries.

10:10 Zsuzsanna Vitai, Geologist at Porcio Ltd., presented five GEO-DH which were developed during last five years in Hungary and supported by European Union and Hungarian government. She highlighted natural gas redemption due to the projects and payback times of the projects. She was asked about the barriers in Hungary which are preventing from further development of the projects. Another question was dedicated to methodology of the payback time calculation.

10:25 Marian Minarovic, Chairman of the Union of Towns and Cities of Slovakia, presented various renewable energy sources from the point of view of municipalities. Special attention was paid to geothermal potential of about 26 prospective geothermal locations with more than 5,000 MW output. Luca Angelino asked about issue of national priorities for underground resources.

10:50 Oto Halas from Slovgeoterm presented two GEODH projects in towns of Sala and Sered. These sources were funded by private investor with financial loans from banks. He also presented initiated projects in Velky Meder, Klasov, Presov and project in Kosice which is under development. He expressed his opinion about legislative barriers.

11:10 Coffee break and informal discussion

11:30 Igor Kocis, representative of Slovakia in European Technology Platforms, presented the presentation dealing with innovations in deep geothermal energy sector. He highlighted approaches in USA and Australia which offer significant support for innovations.

11:50 Martin Kello from VUB bank presented opportunities of funding of renewable energy sources. He noticed that current status of geothermal energy sector is not as developed as other sources, mainly biomass and photovoltaic. He was asked about funding of energy projects lead by municipalities. Another question was dedicated to funding of particular aspects of Structural funds.

12:20 Tomas Kristofic from Geothermal Anywhere introduced PLASMABIT drilling system

12:40 Attendees moved to Deep Drilling Center.

12:55 Deep Drilling Center and PLASMABIT system were presented.

13:45 Lunch and informal discussion



14:25 Lubos concluded the day and thanked to the attendees. In conclusion some barriers have already been identified such as discrepancy in national legislative concerning renewable energy sources, low awareness of representatives of municipalities and lack of interest of representatives of banks to support GEO-DH sector. Interest from the Union of Towns and Cities of Slovakia emerged.

Next steps:

- October 2012 – to publish presentations of the workshop:
 - EGEC at project's website
 - AGEO at its own website
- November 2012
 - EGEC to finalise the questionnaire aimed at target groups
 - AGEO to circulate it within the national target groups
- November – March 2012
 - AGEO to arrange meetings with stakeholders interested in GEO-DH project



Hungary:

www.geodh.eu

**PROMOTE GEOTHERMAL DISTRICT HEATING SYSTEMS IN EUROPE
GEO-DH PROJECT**

**NATIONAL WORKSHOP – HUNGARY
DECEMBER 3., 2012**

Minutes

The Hungarian National Workshop was held in the Geological and Geophysical Institute of Hungary (Project Partner 2). Invitations were sent out in a wide range (available geothermal-related stakeholder lists of PP2, as well as through mailing lists of the Hungarian geothermal associations). The successful contacting resulted in 91 pre-registered participants, out of which 69 people attended the meeting (see attached participation list).

At the meeting after the welcome, Philippe Dumas, project leader gave an overview on the GeoDH project's main aims and structure. This was followed by a presentation by Annamária Nádor, who had a short outlook on Europe's district heating situation and then gave a summary on the developments of the project's web-map tool developments which aim to match the geothermal potential with the heat demand in the targeted countries. The last presentation of the first block was given by Attila Kujbus, who presented the most prominent town-heat projects of Hungary as well as the lessons learned from them.

The second block was dedicated to policy and finances. Ottó Toldi from the Ministry of National Development introduced the National District Heating Action Plan of Hungary, which is the major policy framework for project activities in Hungary. This was supplemented by slides from the Hungarian Geothermal Association, who is a subcontractor of the Ministry by providing a district-heating oriented geothermal potential assessment for the Action Plan. This was followed by two talks from the financing sector: Gábor Kiss from the European Bank for Reconstruction and Development overviewed financial possibilities for large scale projects and introduced the "banker's point of view" which was very useful for future project developers. Zita Dibácsi from the National Environmental and Energy Center gave a talk on available financial support schemes in the frame of the Energy and Environment Operative Program and also provided valuable information on the newly launched EEA grants which will be a brand new support scheme available for the Hungarian geothermal sector from 2013.

After a buffet lunch the afternoon block was focusing on already running projects and municipalities' perspectives. First Péter Lipták from Pannergy introduced the two largest geothermal district heating projects of Hungary in Szentlőrinc and Miskolc. Then János Ádók presented the experiences of the Hódmezővásárhely district heating system, the oldest GeoDH scheme in Hungary with more than 20 years operational experiences. It was followed by a presentation from Dr. Péter Práczki who outlined the development plans of Vecsés, a fastly developing town in the Budapest agglomeration, who became aware of the importance of renewables and geothermal in particular by participating in another IEE supported project: Renewable Energies Transfer System – RETS.



After the presentations there was a brief discussion with several questions (i.e. on experiences with scaling problems in GeoDH systems, importance of heat-pumps, etc). Then, participants had time to fill in questionnaires. Questionnaires will be sent out again after the conference to participants to get a higher number of feed-back to support a fuller evaluation.

Summarizing: the Hungarian National Workshop was of big success, where a high number of participants (outreached main target groups were district heating operators and related technical companies, authorities – e.g. representatives of the Energy Office, as well as municipalities) were informed about the aims and progress of the GeoDH project, as well as current situation in the sector in Hungary. This was the first national workshop where elaborated questionnaires were distributed.

Compiled by Annamária Nádor



Denmark:

Minutes

Promote Geothermal district Heating Systems in Europe

National Workshop – Denmark

6th February 2013

Venue: Copenhagen Municipality, Njalsgade 13, 2300 København S,

Kl. 9.00 -10.00	Registration and opening by Morten Hofmeister, DEDC
Kl. 10.10	Geothermia in Denmark – Projects and potentials <i>Søren Berg Lorenzen, DFG</i>
Kl. 10.25	Permissions for use of geothermia, recommendation for planners <i>Jens Skov-Spilling, The Danish Energy Agency</i>
Kl. 10.45	The role of geothermia in large scale DH systems <i>Jesper Munksgaard og Magnus Foged, HOFOR</i>
Kl. 11.15	The planning proces for geothermia on small DH plants <i>Nighat Kamal, Farum Fjernvarme A.m.b.a</i>
Kl. 11.45	Heatplanning laws and geothermia <i>Renée van Naerssen, The Danish Energy Agency</i>
Kl. 12.10	Enviromental screenings and geothermal projects <i>Søren Berg Lorenzen, DFG</i>
Kl. 12.30	Debate
Kl. 13.00	Lunch
Kl. 14.00	Visit at Amager geothermal plant

All presentations are online on www.geodh.dk

List of major barriers for geothermia in Denmark

(Summary, including result of questionnaire)

From the questionnaire, sent to participants before the workshop and from the workshop, we can conclude that the most important barriers for use of geothermal resources in Denmark are as follows:

- High costs on construction, drilling, management and operations.
- Lack of reliable data regarding the underground and the quality of geothermal resources
- Lack of qualified personnel
- Legal and regulatory barriers – There are many stages of approval connected to geothermal projects. There is especially a problem with the legal demand, that Danish DH plants must supply a combination of electricity and heat.
- High risks at drilling projects. (A recent geothermal project in Denmark went seriously wrong).

Areas, not considered a problem, include:

- Financing. Danish utilities are able to obtain cheap loans, which the municipality vouches for.

- Willingness to try. During the years 2011 and 2012 10 projects involving geothermal resources were launched. Furthermore, the area has political focus, as use of the sources allows for a higher level of integration with the electrical system and a lesser dependence on biomass as a renewable energy source.
- Environmental issues. During the projects, the utilities choose to make thorough investigations of environmental impacts. As long as neighbors and municipalities feel that the environmental issues are taken seriously, they do not become showstoppers.

Legislative concerns regarding permissions for use of geothermia

(Barriers presented by Jens Skov-Spilling and Renée van Nasereen. Discussion hereof)

Legal barriers are a major issue in Denmark. There are high demands for getting permission.

- An applicant wishing to exploit geothermal resources must collect a consortium consisting of people with major experience within the field of geothermia in order to be considered. At the current moment there are not many experts in the field of geothermia in Denmark.
- The applicant must have a solid financial foundation.
- The applicant must have a major focus on the process and a willingness to explore the actual geothermal potential.
- During the process there are 3 stages of approval by the Danish energy agency. 1) Approval of seismic survey, 2) approval of drilling equipment and drilling programme and 3) approval of plan for utilization of geothermal heat
- Furthermore, geothermal plants using electrical heat pumps must be approved as a production facility. This is a major problem as there is a legal demand that production facilities must deliver heat as well as electricity. There is, however, focus on changing this, as new political goals state that DH plants must use a large part of surplus electricity from windmills. Geothermia allows such a construction.
- There is no demand that the establishment of a geothermal district energy plant must be approved in accordance with the frames of the heat supply laws. It is, however, recommended as the delivery of heat from a geothermal plant to end users must be approved separately from the other approvals.
- In order to receive approval to establish a geothermal plant, it must be proven that utilization of geothermia is socio-economically the most feasible solution. This is not a major barrier, however, as utilization of geothermal heat often is the most socio-economically feasible solution – third only to surplus heat and heat from waste incineration. This calculation is helped by the fact that investment costs are not always included in the calculation. It is the municipality that decides the calculation method.

Environmental barriers

There are large environmental barriers in Denmark. If you, however, take these barriers and the concerns of the municipality and the local community seriously, they do not have to be showstoppers.



There are currently 3 operational geothermal plants in Denmark. All projects were thoroughly screened and it was found that no environmental regulations on the plants were necessary. The screenings and the findings of the screenings were useful in communication with the municipality and the local community. Important potential environmental issues were as follows:

- Removal of wastewater from drilling.
- Noise during establishment.
- Mud and waste from drilling
- Risk of polluting underground fresh water supply .

A proper screening takes more than a year to produce.

Financial and operational concerns for establishment of geothermal plant

(Barriers presented by Magnus Foged, Hofor and Nighat Kamal, Farum Utility. Discussion hereof)

The primary barriers for the local utilities are of a technical character. The non-technical barriers

- Lack of knowledge of the actual potential of the underground has been discussed at length.
- The issue of using electrically driven heat pumps was discussed. The cost of using electrical heat pumps is often so high, that it makes it unfeasible to extract heat from the geothermal sources. This means that the geothermal heating plant is not always in use, making the investment less feasible than predicted.
- It is a long process to establish a geothermal facility in Denmark. The establishment of geothermal facilities takes around 5-6 years in Denmark.



Slovenia:

Minutes

Promote Geothermal District Heating Systems in Europe

National Workshop - Slovenia

13th March 2013

Venue: Beltinci Castle, Beltinci

Number of participants: 47

Programme:

- 9:00 – 9:15 Welcome address, Dr. Matej Gomboši, Meir of Beltinci Local Community and Prof. Dr. Alojz Poredoš, President of SDDE
- 9:15 – 10:00 Overview of the GeoDH Project: How to double the geothermal district heating market in Europe, Luca Angelino, EGEC
- 10:00 – 10:30 Geothermal potential in Pomurje, Nafta Geoterm, FNT UL
- 10:30 – 11:00 Brake
- 11:00 – 11:45 Project presentation: Usage of geothermal energy potential in Pomurje, DEM, Faculty of Mechanical Engineering and Faculty of Natural Sciences and Engineering University of Ljubljana, ZTK Beltinci
- 11:45 – 12:15 Project management of GeoDH projects, Blaženka Pospiš Perpar, Eltec Petrol
- 12:15 – 13:00 Discussion
- 13:00 – 14:00 Lunch
- 14:00 – 17:00 Site visit to geothermal district heating system Lendava

All presentations are available on project web page.

Summary

According to the discussion at workshop and questionnaires the following barriers can be set out:

- administrative barriers (permitting in licenses);
- high construction and drilling costs;
- lack of financial supports (such as grants, subsidies, drilling risks insurances etc.);
- discrepancies between national and local regulations;
- relatively closed market – lack of possibilities for new companies to enter the market;
- partly also lack of adequate professionals.

Questionnaires were distributed among participants; 6 questionnaires were returned, 5 of which were district heating and geothermal companies and one from public authorities (local development agency). Also majority of participants were from companies, some from local public authorities and educational/research institutions.



Media publications:

- Energetika.net; 13.3.2013; <http://www.energetika.net/novice/clanki/priloznosti-geotermalnih-virov-v-prekmurju-za-daljinsko-ogre>
- Radio Murski val (pomurje.si); 13.3.2013; <http://www.p-inf.si/aktualno/gospodarstvo/o-geotermalnih-sistemih-daljinskega-ogrevanja-v-be/>
- Energetika.net; 14.3.2013; <http://www.energetika.net/novice/ove-in-ure/drzava-se-bo-morala-odlociti-kaj-z-geotermalno-energijo#>



Poland:

Report from the National Workshop on development prospects and barriers for geothermal district heating systems – Poland 19 March 2013

Date: 19 March 2013

Venue: Kraków, Conference room at Hotel Campanile, Sw. Tomasza Str. 34

Organiser: Mineral and Energy Economy Research Institute of the Polish Academy of Sciences (CB8)

Number of participants: 54 prs

Workshop Agenda

- | | |
|---------------|---|
| 10.00 – 10.30 | Registration |
| 10.30 – 10.40 | Opening of the Workshop, presentation of the participants |
| 10.40 – 11.00 | GEODH Project overview
(Luca Angelino – European Geothermal Energy Council) |
| 11.00 – 11.20 | Prognoses of RES heating sector development in Poland
(Ryszard Wnuk – National Energy Conservation Agency, RES Department) |
| 11.20 – 11.40 | Resource basis for geothermal energy uses for heating in Poland
(Marek Hajto – AGH-UST Faculty of Geology, Geophysics & Environment Protection, Department of Fossil Fuels) |
| 11.40 – 12.00 | State and development prospects for geothermal district heating systems in Poland
(Wiesław Bujakowski, Leszek Pająk – PAS MEERI Renewable Energy Division) |
| 12.00 – 12.20 | Prospects for RES heating sector development in Poland in the light of governmental documents (Małgorzata Turalska – Ministry of Economy, Renewable Energy Department) |
| 12.20 – 12.40 | The concept of geothermal energy development in the Polish cities, with emphasis on district heating systems and PGS actions in this regard (Zdzisław Bociek – Polish Geothermal Society) |
| 12.40 – 13.00 | GeoDH WP3 Questionnaire survey (Beata Kępińska – PAS MEERI Renewable Energy Division) |
| 13.00 – 13.40 | Lunch break |
| 13.40 – 14.20 | Geothermal district heating systems in Poland – case studies: |

- the Podhale region (Czesław Ślimak – PEC Geotermia Podhalańska SA)
 - Mszczonów Municipality (Marek Balcer – Geotermia Mazowiecka SA)
- 14.20 – 14.40 Main legal and formal procedures in geothermal heating projects in Poland
(Barbara Tomaszewska – MEERI PAS)
- 14.40 – 15.40 National, regional and local barriers in geothermal district heating systems' realization
in Poland – round table (legal and formal aspects, economic aspects)
- 15.40 – 16.00 Conclusions of the Workshop, information on further GEODH activities
Workshop closure

Participants

The invitations to attend the Workshop were sent out to about 80 persons and institutions representing various groups of GEODH stakeholders, target groups and other interested entities. About 60 persons pre-registered to the event while 44 persons attended it (some did not arrive due to difficult weather conditions). Among the participants were 8 persons – GEODH partners.

The Workshop was participated by the representatives of various target groups and sectors:

- Municipal and regional authorities,
- District heating and geothermal GEODH companies,
- Energy authorities,
- Potential investors, consulting companies,
- Public sector (state institutions)
- Scientific and R&D institutions, NGO,
- European geothermal industry organization – EGEC.

Introductory background (presentations)

The workshop included nine presentations preceded by the opening by the organizer – PAS MEERI.

The program of the first part of the Workshop embraced several general factors creating the basis and circumstances for current state and geothermal energy use for district heating in Poland. They were presented from the points of view of general national energy strategy as transposed into government institutions and agenda levels; taking into account geothermal resources base and state of its exploration, current state of deployment, and main initiatives to enhance the GEODH development in the country. The perfect background for these issues were given by Mr. Luca Angelino – project leader, who gave consistent overview of GEODH Project, its work plan and expected outcomes. He also highlighted GEODH state and increased momentum of development that had been observed in several EU-states in recent years. At such a wide European background, situation in Poland is very static (low development), without proper interest, support measures and role designed by state documents. This situation is observed despite prospective resource base and good geothermal exploration of the country. Moreover, the initiatives addressing GEODH

deployment proposed by credible circles of geothermal professionals are not sufficiently valued therefore respective actions proceed slow.

Second part of the Workshop embraced presentations of two case studies of GEODHs successfully operating in Poland: in the Podhale region (one of the largest GEODH in Europe: ca. 40 MWth geothermal, ca. 363 TJ geothermal heat sales in 2012) and in Mszczonów Municipality. These two cases show wide temperature range (86-40°C; Podhale and Mszczonów, respectively), variety of technical solutions, capacities and heat supplies, i.e. flexibility of heat production from geothermal water available in the country. Main technological, economic aspects as well as environmental benefits of project organization and operating the heating systems were presented. These cases prove purposefulness, economic viability and benefits of GEODH in Polish conditions.

The above presentations were followed by a talk on main legal and formal procedures in geothermal heating projects in Poland. It was a kind of direct preparation to the discussion on national, regional and local barriers in GEODH systems' realization in Poland.

Round table discussion – barriers' identification

The final part of the Workshop was dedicated to the round table discussion on main barriers for GEODH development in the country. It focused on regulatory and financial aspects as well as some factors which are strongly connected or have direct impact on current situation.

In general the attendees pointed out that although official prognoses predict a very low share of geothermal in the RES mix in the forthcoming years by 2020, it should be noted that Poland has prospective resources especially for heating sector (GEODH).

New Geological and Mining Law – provisions facilitating geothermal projects development

The Workshop participants noticed several provisions introduced by new Geological and Mining Law (put into force in 2012) that facilitate and simplify some legal and administration and procedures by, among others, introducing a single system of licensing for exploration and exploitation drilling works and transfer them to the competences of regional administration. Other provisions that ease geothermally-oriented activities include:

- Exemption from royalties for geothermal water exploitation,
- Exemption from fees for the geological information used for project purposes,
- Reduction of fees for the use of geological information in order to exploit geothermal water (up to 1% of its value to 31/12/2020, then 5%),
- Cancellation of licenses for exploration and prospecting of geothermal water – just geological works project to be approved by the regional administration (no need to prove the funds to operate, no license fee, no contract for mining operation /only the stamp duty for a decision/),
- Shortening the exploitation license procedures by a significant reduction of the duties of cooperation with other bodies while issuing the decision on concession.

The above provisions resulted, among others, from the involvement in several past years of the Ministry of Environment representatives in some activities of GTR-H Project and taking into account some of its recommendations.

The participants pointed also out important role of public support for exploration geothermal drillings and related works and research in several past years. By 2012 it was played by the National Fund for Environment Protection and Water Management, NFEP&WM (program “Energetic use of geothermal resources”). However, it did not apply to exploitation wells. In 1995-2012 that support resulted in a dozen of geothermal projects, including several exploration wells (some started to work as exploitation ones producing geothermal water for heating, some for recreation purposes), R&D projects, and other works (e.g. series of geothermal atlases – valuable sources of information both for scientists and potential investors).

After these statements on positive facts and aspects, further discussion concentrated on weak points and barriers (regulatory, financial, other) and identification of their impacts on GEODH development’s circumstances.

Main regulatory barriers for GEODH development

- Lack of adequate national policy concerning GEODH (as part of RES heat sector) expressed by, among others, lack of comprehensive set of state regulatory acts related to RES sector (geothermal energy is a part of it), specially RES Law which should create proper long-term environment for geothermal projects’ planning and development:

Referring to the positive changes included into Geological and Mining Law, some participants pointed out that it had been expected that they would effectively work thanks to the introduction of complementary relevant provisions in e.g. new RES Law; together they could create more friendly circumstances for geothermal development. These expectations were particularly oriented to introduction of some incentives for RES heat development - for investment phase (like support schemes, fiscal measures) and for production/sales stages (eg. green certificates, FiT, or so). However, the RES Law has been not introduced yet, moreover – its project does not create substantially better conditions for RES heat deployment and does not include financial incentives for RES heat (in that specially geothermal). This Law is oriented for RES electricity (biomass, wind) and bio-fuels. Some support measures will refer to micro-installations (less than ca. 70- 100 kWth; what is not applicable for geothermal taking into account the capacities of heating installations).

- Moreover - in case of geothermal energy (as well as in case of other RES) no support scheme for generation / sales of RES heat is envisaged also by the NREAP by 2020 (despite many demands by the professional organizations and experts).
- No mention in NREAP on the possibility of geothermal electricity co-generation (or generation) by 2020 (despite such provisions postulated by professionals).

As a result, this will prevent receiving support in the form of various certificates (or FiT if introduced) for RES electricity generation (where heat is simultaneously produced). All the more that heat could be directed to DHs (!). The-so-far efforts and contacts of geothermal experts with government representatives resulted in fact that the proposal of new RES Law pays some attention on geothermal co-generation case: if some develops, the factor will be 1.4 applied for its price (what gives some positive signal). One shall also expect that thanks to the GEODH Project it will be possible to persuading further that geothermal shall be treated as one of RES suitable for electricity co-generation / generation (and – heat generation at this same time).

It was also stated that, except provisions of Geological and Mining Law, main legal and financial acts and statements referring to GEODH (and to other RES) regulate this sector at national level, while still there are no regional or local acts.

Main financial barriers for GEODH development

- High upfront investment costs connected specially with drilling stage. This fact hampers GEODH development specially that heat supply belongs to the responsibilities of local governments – when no sufficient public support is available they have no own sources to initiate and to be involved in such projects.
- Lack of financial support for GEODH projects (investment, operation stages).

The participants stressed out that in the situation when no financial measures / tools are planned to be introduced by the state, particularly important shall be to maintain other measures of public support for the projects available in recent years (specially drillings and related surface infrastructure), etc. However, the support from NFEP&WM program mentioned before was closed in 2012. This decision may significantly slow down or even stop the development of geothermal projects, specially for heating purposes. The more that no other relevant sources of public support are proposed (some shall come with new EU- financing perspective 2014-2017).

- Lack of insurance schemes, including the Drilling / Geological Risk Insurance Fund (for many years postulated to be introduced by professionals following the examples of some other countries).
- Although once defined path to achieve profitability of GEODHs in about 10 years has been proved (cases of eg. plants in the Podhale region and Mszczonow Municipality) – since the prices of geothermal heat are at the levels of the gas (and higher than from coal only) – new installations do not receive any financial support and are treated like any other heating project.
- Significant financial problem with GEODH systems may arise from the costs of construction of transmission networks if the owners of the land will enforce the law of the land easement area. This problem has been indicated by a number of investors and operators of heating systems (also non-geothermal). These costs would increase energy costs for clients. Unless appropriate provisions are made (national, regional, local ones), it will slow down constructions of heating grids, increase the costs and reduce the willingness of new customers to join the GEODH systems.

Other barriers for GEODH development

Other barriers strongly connected or having the direct impact on creating regulatory and financial barriers for GEODH development were identified as follows:

- Created for many years an unwarranted belief of many decision makers and the public that geothermal investments are very expensive at all stages (costs, prices and unprofitable GEODH investments). What's more - there is no comparative data of the effectiveness of public support and capital investment compared with the amount of energy generated from various RES (according to available data, geothermal energy is not the most expensive). It was suggested that obligation of such regular comparisons should be introduced in relevant legal acts and provisions, form a basis for decisions on further support and be publicly available.
- Poor level of knowledge and awareness among many decision makers and politicians of various levels, local/regional administration, DH designers, poor interest of ESCO companies.
- Lack of interest and no activities by the above-mentioned entities to promote, consider and initiate GEODH systems (to a great extend this results from minor role dedicated to geothermal energy in state energy strategy and NREAP where it is 'in a shadow' of other RES).



- Lack of consistent contacts and cooperation of some state institutions with the geothermal sector (with some exceptions) what greatly hinders the development and maintenance of long-term policy to promote, support and encourage GEODH development (the more that the country has proper resource base).
- Lack of interest of district heating companies: GEODHs must become subjects of their real interest and introduction into their development and investment plans (this small interest so far was expressed, among others, by the lack of participation in the workshop despite sending invitations to some major companies operating in the areas that have prospective geothermal resources).

The disputants pointed also out several other important aspects:

- Good recognition of geothermal conditions at country level exists (specially covered by the series of atlases). Still there is a lack of detailed elaborations presenting the recognition on regional levels which would facilitate GEODH promotion among the most-decisive (formally and financially) administration levels – regions, districts, municipalities (countries). Only a few regions have adequate elaborations.
- There is sufficient interest and support for the experimental and R&D works on new geothermal technologies like low-temperature geothermal binary schemes and their introduction on the Polish market what might also broaden the GEODH market. Available research programs require a significant financial contribution of the commercial partner - too big (about 40%) specially for new, risky ventures.
- Exploitation and harnessing of geothermal heat has been carried out at the appropriate technological level while the main problems are connected with spent water injection processes. There is a need to intensify experimental and field research on corrosion and scaling phenomena.
- Important role of education and promotion on GEODH addressing various groups of decision makers, professionals and public was also mentioned. This is an indispensable condition to create awareness on geothermal energy resources therefore better conditions for it wider uses, also for GEODH.

The barriers and problems accompanying GEODH development in the country identified during the Workshop will be followed by the Questionnaire survey which shall complete their list – an introduction on its scope and purposes was made during that meeting. The organizers expect to have the feedbacks soon.

The Workshop participants were also informed about the next activities of the GEODH project, and asked for their active contributions and participations when necessary (WP3, WP5).

Compiled by Beata Kepinska (PAS MEERI)



Czech Republic:

GEO DH PROJECT – NATIONAL WORKSHOP

CZECH REPUBLIC

meeting minutes

Date: 25/03/2013

Venue: Litomerice, Czech Republic, Gothic Castle conference hall, Tyrsovo namesti 68

Number of participants: 26

Summary of the workshop:

The National GeoDH workshop held in the Czech Republic in Litomerice on the 25th March was organised by GEOMEDIA Ltd. (EGEC member), supported by the city of Litomerice. The workshop was attended by representatives from various sectors:

- (i) *European industry organisation* - EGEC
- (ii) *Academic institutions* - Institute of Rock Structure and Mechanics of the Academy of Science of the Czech Republic, Institute of Geophysics of the Academy of Science of the Czech Republic, Faculty of Science of the Charles University in Prague
- (iii) *Industrial companies (SME)* – GEOMEDIA Ltd., ISATech Ltd., GEOTERN Ltd., Geonika Ltd., Hennlich Industrietechnik Ltd., GEROtop spol. Ltd.
- (iv) *Municipality sector* – Mayor of the city of Litomerice
- (v) *Public sector* – Ministry of Environment of the Czech Republic
- (vi) *Financial institutions* - Ceska Sporitelna bank

The workshop included six presentations preceded by welcome opening by Mr. Ladislav Chlupac, Mayor of the city of Litomerice. Most of guests were very active and directly involved in discussions following the presentations. The entire event was moderated by professor Bedrich Moldan, former Minister of Environment. The workshop was concluded by Dr. Michal Stibitz, executive manager of GEOMEDIA Ltd., lead workshop organiser. After lunch, all interested participants were kindly invited by Mr. Ladislav Chlupac to a guided tour of the Gothic Castle.

The programme of the workshop is included in Annex 1.

The list of participants is included in Annex 2.

Discussion topics:

- Compared to other renewable resources, the district heating (DH) sector suffers from the deficiency of lobbying activities and which implies:
 - limited investments;
 - limited availability of public resources, such as subsidies and other economic incentives.
- The Czech Republic has more potential for geothermal heating than for geothermal electricity production.

- Barriers for geothermal DH were identified, such as lack in the Czech national legislation concerning renewable energy sources.
 - Up to date, there is no relevant legal regulation and guidance focussing on delineation of protection zones related to geothermal resources.
 - Another problem is that geothermal energy is treated in similar manner as other renewables, such as PV or wind. This approach does not provide for appropriate conditions for development of geothermal DH.
- The Ceska sporitelna bank (belonging to the Erste Group, Austria) has been expressing the interest for supporting of geothermal activities in the Czech Republic.
Mr. Petr Varju, the Ceska sporitelna representative in Project & Infrastructure finance, confirmed great interest in geothermal projects but highlighted a prevailing mistrust resulting from various aspects of such great projects (technical issues etc.). Ceska sporitelna needs guarantee from developers.
- Geothermal drilling requires dedicated approach for delineation of protection zone of the geothermal resource. So far, protection zones are determined on the basis of analogy with projects on underground gas storages or ordinary mineral deposit protection zones. However, problems still remain, e.g. issue of spatial extent of this protection zone (Dr. Pavel Rajman).
- Geothermal projects needs financial support from public sector and cooperation of public and private bodies (prof. Bedrich Moldan).
- EU finance support will be examined in the frame of the GeoDH project as well as effort will be made to provide the overview of financial tools provided by commercial and other banks (e.g. EIB) for geothermal heating business plans (Mr. Luca Angelino).
- Litomerice geothermal project under development
 - Temperatures regime in the existing deep exploratory borehole PVGT-LT1 was discussed. According to measurements of the Institute of geophysics, the temperature reaches 35°C in 1000 m depth (Dr. Jan Safanda).
 - The Litomerice project has got planning permission, the building permit for drilling activities is still pending (Mr. Antonin Tym).
 - With respect to phase-wise availability of financing for large geothermal development project, a division of geothermal project into more phases proves useful. The major categories in such division would be (1) scientific research and (2) commercial application.
 - Mr. Ladislav Chlupac highlighted the issue of gaps in Czech legislation and insufficient support from public bodies for geothermal energy use in the Czech Republic. Deep drilling to 5 km depth is essential for further deep geothermal development in the country! The legislative support has to follow technical progress!

ANNEX 1: CZECH GEODH WORKSHOP PROGRAMME

NATIONAL WORKSHOP FOR GeoDH PROJECT, 25.3.2013, LITOMERICE

Conference Hall of the Litomerice castle, Tyrsovo namesti 68, Litomerice

Moderated by: Prof. Bedrich Moldan

9:30 **Registration**

9:45 **Opening, introduction of the program and participants**

Ladislav Chlupac, Mayor of Litomerice

Antonin Tym, geothermal project manager, Litomerice municipality

10:00 **EGEC (European Geothermal Energy Council) – presentation of the organisation, objectives, role of EGEC in development of geothermal energy resources, geothermal projects in Europe**

Overview of the GeoDH Project: How to double the geothermal district heating market in Europe

Luca Angelino, EGEC

Overview of geothermal heating systems in the Czech Republic

Hana Jiráková, GEOMEDIA Ltd.

European significant projects focusing on deep & shallow geothermal resources

Michal Stibitz, GEOMEDIA Ltd.

Potential for development of geothermal energy use in the Czech Republic – potential sites, accessibility of deep geothermal resources

Jan Safanda, Head of geothermal department, Institute of Geophysics of the Academy of Sciences of the Czech Republic

DISCUSSION

11:15 **COFFEE BREAK**

11:45 **Litomerice Geothermal project - past, present and future of the project, objectives and project significance, project preparation, identification of barriers during realization process**

Antonin Tym, geothermal project manager, Litomerice municipality

ORC cycles related to geothermal energy

- **New trends in direct electricity generation from low-temperature heat**
- **Research on new technologies – challenge for local economy development**

Karel Kodis, Hennlich Ltd., Litomerice

PANEL DISCUSSION

Luca Angelino, Jan Safanda, Michal Stibitz, Litomerice municipality representative

CONCLUSION

Michal Stibitz, GEOMEDIA Ltd.

13:15 **LUNCH, PRESS BRIEFING**

Contact:

Hana Jirakova, tel. +420 602 532 301, e-mail: hana.jirakova@geomedia.cz

Antonin Tym, tel. +420 725 095 137, e-mail: gte@litomerice.cz

Venue: Tyrsovo namesti 68, Litomerice

<http://www.qotickyhrad.cz/>





Italy:

GEODH PROJECT - ITALIAN WORKSHOP INTERNAL REPORT

Date: 11/12/2012

Place: Piancastagnaio (SI)

Number of participants: 31

Notes: the workshop was integrated by the conference organized by CoSviG on geothermal energy, held the day before in Piancastagnaio and entitled "*The Heat of the Earth, learn to understand and share the use*". The conference, which was attended by about 50 people (including national and international researchers, local authority representatives and operators), intended to take stock concerning the current state of knowledge about geothermal energy, its use and possible improvements of the sustainable exploitation of the geothermal resource, even if in terms of direct uses and DH systems.

Summary of the workshop

The Italian GeoDH workshop held in Piancastagnaio (SI) on the 11th December 2012 was attended by companies (especially SMEs) operating in the field of geothermal energy, district heating and renewable energy.

Researchers and representatives of public bodies (mostly mayors of Tuscan geothermal municipalities) were also present.

As for the public, the complete absence of ESCOs was the only weakness observed, while participation was very active, as most of guests were directly involved in discussions aroused by presentations.

The Italian and Tuscan background

In Italy, the lack of an appropriate regulatory framework that regulates DH and defines the kind of service (public or private) causes confusion and negative effects on economic competitiveness of this technology. In this context, the National Authority for Competition and Market (AGCM) is carrying out an investigation on DHs characteristics, in order to better understand how the issue of regulatory gap is resolved and clarifying the issue of the value attribution to heat distributed with geothermal DHs, also considering external costs.

The totality of Tuscan geothermal DHs are currently connected to high enthalpy plants, characterized by small villages, low number of consumers (therefore lower cost-sharing) located on a wide territory and city centers with architectural constraints. Such a situation leads to operational issues, which involve higher costs in designing and executing first and then in management.

Higher expenses of construction and management, raise the payback period to 30 years and lead to increased tariffs, lowering the economic competitiveness of this service. It was also reported that technical issues and management costs increase in final networks portions.

However, the management of a geothermal DH system installed 40 years ago in the Tuscan geothermal area has been improved introducing more efficient exchange groups, remote control and automatic regulating flow rate valves, which allow modular supply according to heat demand and the reduction in electricity and heat demands.

The heat consumption of geothermal DH has also been diversified, adding to the network industrial activities as a forage drying, ovens for varnishing, laundries, etc. This has had effects both from an economic point of view and in the quality of service, allowing the connection to DH network also in country areas.

Positive impacts have been observed on the local economic development and tariffs for end users are cheaper than those of methane (i.e. to heat 300 m³ are spent 600 €/year), though preserving a payback period of 12 years. However, a higher investment for the DH plants construction, would result in a saving on maintenance and any further changes to the network.

Technical solutions

From a technical and designing point of view, in order to obtain a more sustainable exploitation of low enthalpy geothermal resources, some issues seem to be tackled through wells using the doublet scheme,

mainly used in France. This application allows the total re-injection of geothermal fluid and a higher concentration of plants in the area. The current availability of technologically advanced materials as highly efficient working fluids and electronic control systems of heat supply according to demand, also allow to use lower temperatures and achieve a higher energy efficiency of district heating (DH). In this context several low-impact energy sources can be integrated, such as cogeneration, waste heat recovered from incinerators and other industrial processes, heat pumps capable of extracting heat from cold fluids (seawater, river water or water leaving treatment plants) and shallow geothermal energy or at lower temperatures. All this determines: increase of resource availability, reduced mining risk, lower investment costs and simplified authorization procedures. The opportunity of using lower temperatures, combined with the integration of several heat sources and proper energy efficiency of plants and buildings, also allows a reduction of energy demand, lower investment costs, payback periods shorter than 15 years and consequently greater economic competitiveness.

Conclusions

Current barriers that hinder geothermal DH market, identified after during the Italian workshop may be listed as follow:

- 1) Compared to other renewable sources (e.g. PV systems), the DH sector suffers from the **deficiency of a lobbying** activities and this implies:
 - Reduced investments
 - Limited availability of public resources, such as subsidies and other economic incentives
- 2) **Lack of adequate national policies** concerning geothermal DH, which causes:
 - Iniquity on the regulatory apparatus
 - Iniquity on the classification of the service in terms of public/private supply
 - Energy and land use planning that do not take in consideration the realization of new geothermal DHs or the expansion of those already existing
 - Lack of policies aimed to promote technological research
- 3) **Technical aspects:**
 - Lack of specific solutions for geothermal DHs, as those used until now make mainly use of applications used for other purposes
 - Lack of integrated energy systems, so that each territory can use locally available resources
- 4) **Surface facilities:**
 - Inefficient DH networks
 - Low energy efficiency buildings
 - Sparsely populated and scattered urban settlements, which hinder a fair heat distribution
- 5) **Poor level of knowledge** about:
 - Availability of local shallow and low enthalpy geothermal sources
 - Status of heat demand
 - Best available technologies

Concluding, suggestions proposed during the workshop, to reduce costs that hinder the installation and management of geothermal DH may be mainly achievable by:

- Economic incentives (e.g. tax relief, subsidies, grants, etc.)
- Mining risk coverage
- The design of hybrid solution implying integration of renewable energies locally available (especially when geothermal resources do not allow to fully cover heat demand)
- The refurbishment of buildings in terms of energy efficiency, in accordance to the European guidelines
- A diversified heat demand, by size and kinds (residential or productive)
- More fairness in providing the service to the whole community, maintaining at the same affordable tariffs.



France:

GEODH PROJECT - FRENCH WORKSHOP INTERNAL REPORT

Date: 27/03/2013

Place: Pessac (Aquitaine Region)

Number of participants: 75

Notes: the workshop was organized in collaboration with the "Pôle AVENIA" (Competitiveness cluster in geosciences) based on Pau (Aquitaine Region) and member of the AFIG.

Each participant gets a participant file with the:

- List of the participants (name, surname, companies and location)
- Agenda of the workshop,
- First GeoDH project Newsletter (December 2012)
- Questionnaires on regulatory barriers

Summary of the workshop

Our workshop was organized in two main parts:

In the morning, general presentations about the project GeoDH, the management of geothermal district heating, the regulatory and financial aspects.

In the afternoon, we focused on the regional level with the presentations of 2 geothermal district heating operating since several years in the Aquitaine Region: City of Bordeaux (Plant of Mériadeck in Gironde) and Mont-de-Marsan (Landes).

Our objective was also to highlight the French Know-how developed in the Paris Basin so that it can be utilized as a reference for the Aquitaine potential GeoDH actors.

We are particularly satisfied with the rate of participation to the workshop as 75 people attended the meeting. Many companies operating in the field of district heating (GeoDH operators, design agencies, manufacturers...), two ESCOS (Gaz de Bordeaux, Régie de Mont de Marsan) but also several representatives of regional public bodies (Ville de Bordeaux, Conseil Régional d'Aquitaine, Communauté Urbaine de Bordeaux) took part to the workshop. Participation was very active and participants didn't hesitate to intervene during the Q/A sessions.

The French background

In France, it is commonly accepted that the regulatory framework dedicated to geothermal DH is quite appropriated. Even if it is sometimes considered as too complicated, it is good that the French regulatory framework actually do exist. Regarding this topic, the only thing that can be noticed is the participation of the AFIG to the works of the Mining Code reform. This action aims to reinforce the position of geothermal energy in comparison to other subsurface activities and to determine a simplified framework for low enthalpy geothermal.

Aquitaine background

List of existing geo DH in the Aquitaine Region:

N°	Nom du forage	Utilisation actuelle de la chaleur	Géothermie	Localisation	Optimisation de la ressource géothermique sur le principe de mutualisation (réseau de chaleur)
1	Mériadeck	Filière Géothermique pour le chauffage urbain local	BE	Bordeaux	<i>Réseau urbain existant</i>
2	Benauges	Filière Géothermique pour la piscine	BE	Bordeaux	Réseau de chaleur pour distribution périphérique
3	Stadium	Filière Géothermique pour la piscine universitaire	BE	Pessac	Réseau de chaleur pour distribution périphérique
4	Saige-Formanoir	Filière Géothermique pour le chauffage urbain local	BE	Pessac	Réseau de chaleur pour distribution périphérique
5	BA 106	Filière Géothermique pour le chauffage urbain local	BE	Mérignac	BA 106, Aéroport de Bordeaux-Mérignac, réseau de chaleur pour distribution périphérique
6	Génicart	Inutilisé à ce jour	BE	Lormont	Réseau de chaleur pour distribution périphérique ou éventuel projet de centre aquatique
7	Grand Parc	Inutilisé à ce jour	BE	Bordeaux	Réseau de chaleur pour distribution périphérique
8	Esso Rep	Inutilisé à ce jour	TBE	Bègles	Réseau de chaleur pour distribution périphérique

The City of Bordeaux:

Ms Anne WALRYCK, Deputy mayor in charge of sustainable development for the city of Bordeaux, inaugurated the workshop with a 20-minutes speech mainly announcing that geothermal energy projects were about to be re-launched in the coming years.

An official act which is expected on April 2013 will indeed lead to a re-activation of the operating licenses of the existing GeoDH and will enable the developments of new permits for deep drillings (1000m) in order to provide all the new urban developments with heating. Three districts that will be transformed should benefit of small DH network using as much as possible the geothermal energy: "Euratlantique", "Bastide Niel" and "Brazzaville".

Moreover some other operations of existing projects, such as "Bordeaux Grand Parc" where the geothermal wells drilled 20 years ago, are re-evaluated and the City of Bordeaux looks forward to put it in service.

The City also designated a mayor coordinator specially dedicated to geothermal energy: Mr Jean-Michel DURAN.

The Urban Community of Bordeaux (Communauté urbaine de Bordeaux – C.U.B.)



The C.U.B. that is gathering the City of Bordeaux and [27 peripheral cities](#) has launched a similar approach, in particular in the cities of Pessac and Bègles (where a doublet realized 30 years ago and now stopped, will be retro-fitted). We can also underline the fact that the C.U.B. got the "[Citergie Label](#)" during the Environment Conference 2013 (Assises de l'environnement) which aims to promote sustainable policy in energy. The C.U.B. has

indeed already engaged 80% of its Climate Plan actions.

The Aquitaine Region:

In closed collaboration with the ADEME, the Aquitaine Region is really active in the co-financing of geothermal projects eligible to the Heating Renewable Funds (Fonds Chaleur).

Aquitaine region is also setting up an innovative financial support scheme to promote renewable energies. This process of “subsidies loans” was contracted between the European Bank of Investment (E.B.I.) and three other regional banks (Banque Populaire, Caisse d’Epargne et Crédit Agricole).

Moreover, in the declination of the Grenelle Environment roundtable initiated in 2007, each French Region had to realize its “Regional climate, air quality and energy plans” (Schéma Régional Climat-Air-Energie - SRCAE). Two main scenarios have been developed in Aquitaine Region: “Grenelle+” and “Durban”. The main goals regarding the energy management and the development of the renewable energies until 2020 are summarized in the following table:

- an amelioration of the energy efficiency between 28,5% and 41%
- the share of renewable energy in the final energy consumption between 25,4% and 34,6%

“Scénario Grenelle+” (geothermal in red)

Fillères de production		Production en Aquitaine estimée 2010 (GWh)	Estimation de la puissance installée en 2010 (MW)	Mix de production proposée en 2020 (GWh)	Estimation de la puissance installée en 2020 (MW)	Effort sur 2010-2020 (MW)
Production de chaleur d'origine renouvelable	Biomasse dans l'industrie	6 814	2 963	7 159 ¹⁹	3112	150
	Bois de chauffage des ménages	4 806	2 090	5 392 ²⁰	2344	255
	Chaufferie bois tertiaire	92	39	263 ²¹	114	75
	Valorisation énergétique des déchets	79	34	33 ²²	14	-20
	Géothermie (2004)	111	48	400	174	126
	Solaire thermique (2007)	14	24	594 ²³	[928] ²⁴	[580]
	Méthanisation (dt injection) ²⁵	10 ²⁶	1,3	480 ²⁷	60	30
	Total	11 926		14 320		
Production d'électricité d'origine renouvelable	Hydraulique (yc pompage)	1 696	628	1 965 ²⁸	705	77
	Biomasse	427 ²⁹	85 ³⁰	1147	229 ³¹	144
	Valorisation énergétique des déchets	171	20	117	20	0
	Solaire photovoltaïque (relié au réseau)	90	82	1 000	909	827
	Eolien	0	0	819 ³²	390	390
	Méthanisation			105 ³³	30	60
	Total	2 384		5 153	2 284	1 468
Total de la production EnR locale		14 310		19 473		
Dt Biocarburants (Politique nationale)				2 608		
Total de la consommation d'énergie provenant de sources renouvelables				22 081		

Scénario Durban (geothermal in red)
Tableau 8: Sources d'énergies renouvelables en Aquitaine en 2020 dans le scénario Durban en Aquitaine

Filières de production		Production en Aquitaine estimée 2010 (GWh)	Estimation de la puissance installée en 2010 (MW)	Mix de production proposée en 2020 (GWh)	Estimation de la puissance installée en 2020 (MW)	Effort sur 2010-2020
Production de chaleur d'origine renouvelable	Biomasse dans l'industrie	6 814	2 963	8 529 ³⁵	3708	746
	Bois de chauffage des ménages	4 806	2 090	5 557 ³⁶	2416	326
	Chaufferie bois tertiaire	92	39	239 ³⁷	120	80
	Valorisation énergétique des déchets (2006)	79	34	33 ³⁸	14	-20
	Géothermie (2004)	111	48	400	174	126
	Solaire thermique (2007)	14	24	1187 ³⁹	[1 835] ⁴⁰	[1 810]
	Méthanisation (dt injection)	10 ⁴¹	1,3	960 ⁴²	120	120
	Total	11 926		16 905		
Production d'électricité d'origine renouvelable	Hydraulique (yc pompage)	1 696	628	1 965 ⁴³	705	77
	Biomasse	427 ⁴⁴	85 ⁴⁵	1 147	229 ⁴⁶	144
	Valorisation énergétique des déchets	171	20	117	20	
	Solaire photovoltaïque (relié au réseau)	90	82	1200	1091	1009
	Eolien	0	0	1 260 ⁴⁷	600	600
	Méthanisation			210 ⁴⁸	60	60
	Total	2 384		5 899	2 705	1 890
Total de la production EnR régionale		14 310		22 804		
Dt Biocarburants (Politique nationale)⁴⁹				2 164		
Total de la consommation d'énergie provenant de sources renouvelables				24 968		



GeODH Workshop France

Geothermal district heating: project management, financial solutions, support schemes

Wednesday March 27, 2013

Condorcet Centre in Pessac (Bordeaux area, Aquitaine)

9:00-9:30: Welcoming coffee
9:30-9:45: **Opening by AVENIA Geoscience Cluster & AFPG president C. BOISSAVY**
9:45-10:05: **GeODH project overview** - Miklos ANTICS, European Geothermal Energy Council - EGEC

10:10-11:30 Geothermal District Heating: the French model
1) Legal & regulatory framework - P. JAMET, DALKIA
2) Geothermal DH Business model – N. MONNEYRON, COFELY
3) French support schemes – G. PERRIN (ADEME)
4) Regional support: the Aquitaine example – J. MICHELS, Conseil Régional d’Aquitaine

Q&A session with the audience

12:00–13:30: Lunch break (buffet provided on site, sponsored by AVENIA & AFPG)

13:30–15:30: Operational feedback & case studies
1) Geothermal district heating in the Bordeaux area: a quick look at the current situation – H. LAUTRETTE, BURGEAP
2) 30 years of operations on the largest geothermal district heating network in Europe near Paris: history, operational feedback and perspectives – M. ANDRES, SEMHACH
3) What economic model for geothermal district heating in Bordeaux? – G. MAZEAU, GAZ DE BORDEAUX
4) Geothermal development & financing in Mont de Marsan: management model and expected capex & opex – T. SOCODIABEHRE, Mairie de Mont de Marsan

Q&A session with the audience

15:30-16:30: Transfer to the Meriadeck geothermal facilities (located in downtown Bordeaux)

16:30-18:00: Visit of the Meriadeck surface facilities with G. MAZEAU of GAZ DE BORDEAUX

FREE EVENT - CLICK HERE TO REGISTER





Germany:

Agenda

National Workshop – GERMANY

Chances and Barriers for Geothermal District Heating Systems

19th FEBRUARY 2014

Organised by the European Geothermal Energy Council (EGEC) in cooperation with
Wirtschaftsforum Geothermie (WFG)

Venue: Messe Offenburg, Schutterwälder Str. 3 - 77656 Offenburg, Germany

Contacts: Burkhard SANNER and Philippe DUMAS: com@egec.org ;
phone: +32 2 400 10 24

12.30- 13.00	Lunch is provided, Registration
13.00 - 13.10	Opening by the moderator of the day: B Sanner
13.10- 13.30	GeoDH project overview
13.30- 14.00	Potential for geothermal DH in Germany and Europe
14.00- 14.20	Best practice example for GeoDH: Case study
14.20 -14.30	Presentation of the GeoDH-proposal for a European regulatory framework for geothermal district heating
14:30 - 15:00	Roundtable on the regulatory barriers
15.00 - 15.30	Coffee Break
15.30- 16.00	Roundtable on the financial barriers
16.00 - 17.00	WFG Discussion on geological risk
17.00	Conclusions of the day



EGEC, in cooperation with the Wirtschaftsforum Geothermie (WFG) invites you to this workshop to discuss the specific problems of geothermal district heating in Germany, and to compare the German experience with that of other EU member states.

Issues in focus are licenses, the geological risk, economy, public support, etc. The proposal for a European regulatory framework for geothermal district heating, which is currently under public consultation, will also be presented and discussed (the draft can be download from geodh.eu/library).

Please mark this date in your diary!

The workshop participants are invited to have a light lunch at 12:30, before the first session starts at 13:00. The event is scheduled to end at around 17:30. The exact agenda will be published mid-January 2014.

The workshop language will be German, and no translation will be provided. However, interventions in English will be possible during discussion.

Participation in the workshop is free of charge. Because of the limited number of participants a binding registration is required. Registration can be completed at www.geodh.eu/project-workshop-offenburg.

The workshop is scheduled on the day before the trade fair GeoTHERM 2014 in the same venue, and will thus enable a combination with a visit to the fair at the following day.

The GeoDH project is supported by the EU and coordinated by EGEC. It investigates the potential of geothermal district heating in Europe, the possibilities to actual make use of it, the licensing practice, and the economic and regulatory barriers in various countries of the EU. More info on the project can be found on the website www.geodh.eu.

Organised by EGEC

in cooperation with WFG

(local organisation by EGEC-member UBeG GbR)

