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www.geothermaleranet.is

EDITORIAL

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How can Geothermal contribute to increase energy security and savings in Europe?

Geothermal resources have been used successfully and economically in some locations in Europe where geological conditions are exceptionally favourable (e.g. Italy and Iceland), but they can play a much more important role at the European scale, if they can be made accessible in other places.

Numerous projects in several countries (e.g., in France, Germany, Switzerland) have started to make use of this source of energy applying new approaches.

On top of the long term climatic challenges Europe is now looking at instability and limited security of the gas market and the countries are now feeling the urge to limit the dependency on gas and fossil fuels. Since a substantial part of the gas consumption is used for direct heating of homes and domestic hot water the obvious choice is to develop methods to use renewable, carbon free sources for this purpose.

For regions with known access to geothermal energy such as the Pannonian basin and the Molassen stretching from Switzerland into Germany we have the possibility to tap the geothermal sources for energy that with good economy can replace gas use and be a game changer in improving the energy security, cost savings and mitigating climate change.

District heating can play a key role in this aspect. In the Nordic countries we have good examples where district heating provides means and the flexibility to utilise various sources of renewable energy from surplus wind power, biomass, waste heat from industries, heat pumps and geothermal. In Sweden we can follow how this has paved the way from 100% fossil fuel dependency to more than 80% renewable energy delivered by the district heating networks.

In many regions in Eastern Europe we have district heating networks that have wide coverage but have severe technical problems due to inferior technology from the start and lack of maintenance. Individual customers have found it more economical and secure to provide heating and hot water from their own gas boilers which in turn has led to deteriorating economy for the district heating plant operation.

It is of high importance that necessary financing is provided to break this negative spiral. District heating systems are without comparison our most effective instrument to provide heating and even cooling with lowest possible CO_2 emission regardless of if we have access to geothermal energy or not.

The feed in tariffs system that has been the dominating instrument for enhancing use of renewable energy sources such as the sun or the wind have specified cost frame for certain technologies. We now see emerging subsidy systems that are technology neutral in such a way that they give premium for delivered energy based on saved CO_2 emissions regardless of the technology used. Bidding rounds in competition in the Netherlands have shown that the use of geothermal energy can be very cost efficient compared to other conversion technologies when it comes to CO_2 savings per cost unit including capital cost and operation.

It is therefore important for policymakers and others to recognise the great opportunity regarding geothermal heating for savings for countries, as it is estimated that geothermal heating in Iceland is saving equal to 7% of GDP or 3000 US$ per capita or close to 1 billion US$ for the economy only for 2012. It has also been estimated that renewables for heating and cooling could save EUR 11.5 billion per year within EU, improve the energy security and mitigate climate change.

Geothermal ERA NET

VISION

- *Minimize the fragmentation of geothermal research in Europe*
- *Build on European know-how and know-who to utilize geothermal energy*
- *Contribute to a framework to realise large opportunities in the utilization of geothermal energy through joint activities*

RENEWABLE NEWS

Renewables for heating and cooling could save EUR 11.5 billion per year within EU

AEBIOM, EGEC and ESTIF representing the biomass, geothermal and solar thermal sectors respectively, addressed an open letter to the Heads of State and Government, ahead of their spring meeting in Brussels 19th of March 2014.

The letter is stating among others that *"...Investing in renewables for heating and cooling will bring security of supply and more competitiveness, and could save EUR 11.5 billion per year, announces the industry.*

Over recent years, the lack of awareness and political support to renewables for heating and cooling has meant only modest market development in the sector. However, in view of the upcoming discussion of the European Council on EU climate and energy policies beyond 2020, there is a great opportunity to invert this trend.

Decarbonising our energy sector should not be regarded as a burden, but rather as an opportunity for Europe's industrial renaissance. Clear pledges on renewables for heating and cooling and energy efficiency will increase EU's energy independence, while improving our balance of trade, creating a substantial amount of new local jobs and ensure stable and affordable energy prices to our consumers and industries". http://egec.info/

Renewables for heating in Iceland is already saving 7% of GDP or equivalent 3000 US $ per capita every year

In a cold country like Iceland, space heating needs are greater than in most countries. In Reykjavik, extensive distribution of hot water for heating homes began in 1930. Already in the 1940s, the State Electricity Authority promoted geothermal development and carried out a regional survey of geothermal areas suitable for space heating and explored promising fields with exploratory drilling.

When the oil crisis struck in the early 1970s, fuelled by the Arab-Israeli War, the world market price for crude oil rose by 70%. The oil crises in 1973 and 1979 caused Iceland to change its energy policy, reducing oil use and turning to domestic energy resources, hydropower and geothermal heat.

Throughout most of the period 1970–2012, oil heating was 2-6 times more expensive than geothermal heating but peaks to 16 times more expensive in the period 1973 to 1985 and has risen again since 2007 to a present ratio of 10.

In comparison to the cost of heating with oil, the annual savings in Iceland have been in the range of 1–2% of the GDP for most years from 1970–2012, but rose to 7% in the period 1973 to 1985 and are reaching that peak again in recent years.

The 7% of GDP are equivalent to 3000 US$ per capita or total close to 1 billion US$ for the economy, or about 80% of the state budget cost of health care at the same year 2012.

The Geothermal heating in Iceland have therefore approved that it can contribute to huge savings for the economy and citizens, as well to cleaner environment every year. There are therefore great possibilities of savings based on geothermal heating, in other countries with geothermal potential, which depends on policy, research and possibilities in each area.

Geothermal District Heating has the potential to alleviate Europe's energy *security crisis*

"Geothermal district heating has the potential to alleviate Europe's energy security crisis" – is stated in a press release from Geothermal District Heating (GeoDH) in Brussels, 15th May 2014.

In the release it is stating among others that

"*Over 25% of the EU population lives in areas directly suitable for Geothermal District Heating (GeoDH)[1]. There is a large potential in Central and Eastern Europe, with GeoDH systems in operation in 22 European countries including Hungary, Poland, Slovakia, Slovenia, the Czech Republic, and Romania, where existing heat networks are well developed.*

Geothermal district heating is a valuable and immediate option for the alleviation of Central and Eastern Europe's dependency on Russian gas.

The main benefits of geothermal heating and cooling are provision of local, baseload and flexible renewable energy, diversification of the energy mix, and protection against volatile and rising fossil fuels prices. Using geothermal resources can provide economic development opportunities for countries in the form of taxes, royalties, technology export, and jobs.

In order to increase awareness, GEODH, an IEE project co-financed by the EU - has assessed and presented for the first time the potential in Europe on an interactive map.

From the map we can note that:

- *GeoDH can be developed in all 28 EU countries;*
- *Geothermal can be installed with existing DH systems during extension or renovation, replacing fossil fuels;*
- *New GeoDH systems can be built in many regions of Europe at competitive costs;*
- *The Pannonian basin is of particular interest when looking at potential development in Central and Easter Europe.*

According to Eurostat, about one third of the EU's total crude oil (34.5%) and natural gas (31.5%) imports in 2010 originated from Russia. Of this, 75% of the gas is used for heating (2/3 in households and 1/3 in the industry). Geothermal DH technology has the potential to replace a significant part of that fuel. In order to enable such a development the specific proposals from the GeoDH consortium are to:

- *Simplify the administrative procedures in order to create market conditions which would facilitate development;*
- *Develop innovative financial models for GeoDH, including a risk insurance scheme, and the intensive use of structural funds;*
- *Establish a level playing field, by liberalising the gas price and taxing GHG emissions in the heat sector appropriately;*
- *Train technicians and decision-makers from regional and local authorities in order to provide the technical background necessary to approve and support projects."* www.geodh.eu

PROGRAM NEWS

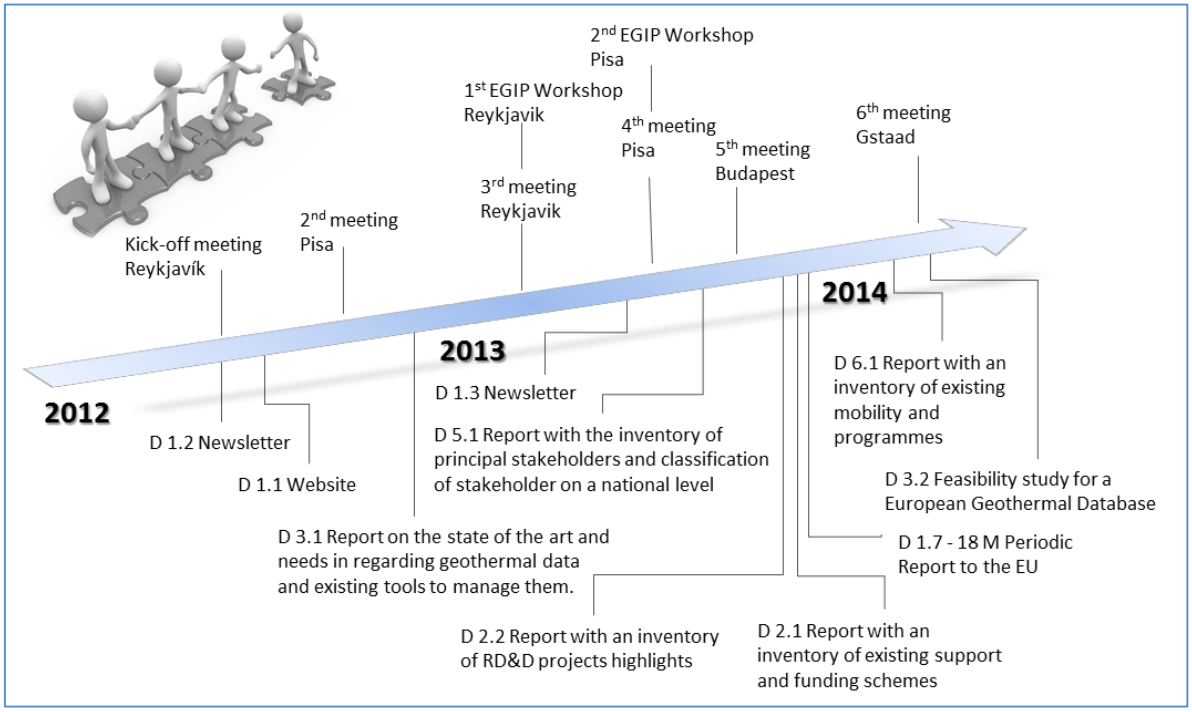
What has been achieved?

During the first 24 months of the Geothermal ERA NET the focus has been put on exchanging information on the status of geothermal energy utilization, including national support schemes and research, development and deployment (RD&D) activities and the creation of an inventory report on these activities.

Emphasis has also been put on gaining an understanding of the principal stakeholders, including key industry players for a successful, Europe-wide coordination of publicly funded national research, development, deployment and innovation geothermal energy programmes. Great efforts have also been put on the preparation for a Joint European Data/Information platform called EGIP or European Geothermal Information Platform.

In order to identify areas of collaboration the Geothermal ERA NET mapped existing mobility and training programmes at national and European level. Special attention was given to the trans-national aspects of the programmes, i.e. if they are open to researchers of all nationalities. The results of the mapping is demonstrated on an interactive map which can be found under this link.

https://mapsengine.google.com/map/viewer?mid=zxd60TZthCCU.ktuAqcSJZv8I



The **Geothermal** ERA NET program is split into 7 Work Package:

1. Coordination and Management
2. Information exchange on National incentives and status on Geothermal energy
3. Towards a European Geothermal Database
4. Development of Joint Activities
5. Coordination with Stakeholders
6. Transnational Mobility and Training
7. Implementation of Joint Activities

More information regarding the program and progress can be seen at the website,
http://www.geothermaleranet.is/

Interactive map to indicate Transnational Research Agenda and Programs

WP 6 addresses transnational researchers' mobility and a common approach in training of research talents as adequate human resources and capacity have to be in place to achieve targets in geothermal research. A coordinated approach to research has to be supplemented by idea exchange and the development of a trans-national approach to research training.

Feasibility Study for a European Geothermal Information Platform (EGIP)

GEO ERA-NET partner countries have proposed to set up European Geothermal Information Platform (EGIP), as organization and sharing of geothermal data play an important role, as was specifically mentioned in recent EU Commission Call.

The mission is to increase the share of potential geothermal energy users - primarily international operators, and surveyors - primarily European bodies.

Creating an EGIP now that the INSPIRE directive are being implemented has several benefits:

- Guaranteed data interoperability: retrieval, viewing and access of information from partners/providers.
- Harmonized geothermal domain at a European level.
- Efficiency, data linked directly to national databases.
- Guaranteed ownership: data belong to and stay in the country they are related to. Each country decides what to share and what to keep private.
- Durability and maintainability, since this is information is directly related to national data sources.
- Economically viable, requiring only coordination with what each country would need to develop.
- Productivity, by covering all published data, long term.

Geothermal energy status & policy review

The Geothermal ERA NET focuses on direct use and higher enthalpy uses of geothermal energy. The consortium does not consider shallow geothermal energy for geothermal heat pumps, which is a different market with its own characteristics and challenges.

Geothermal energy utilisation accounts for 68% of energy utilisation in Iceland, and one could say that the potential that this energy source holds for this country is largely deployed. Italy also has a significant geothermal production. It ranks as fifth country in the world for geothermal electricity production. After Turkey, Iceland and Italy, Hungary is ranked at 4th place regarding installed geothermal direct use in Europe. For all other participating countries, geothermal energy is an energy source with potential.

With the exception of Iceland, all countries have an ambitious agenda for an increase of the market for geothermal energy. In all countries except for the Netherlands and Slovenia, this includes a significant growth in electricity production with geothermal energy. Up to 2020, the Netherlands will focus on direct use. In all participating countries, there are policy instruments in place to forward geothermal energy utilisation. This includes R&D efforts, but in some countries also soft loans or guarantee funds.

The Geothermal ERA NET group met for the sixth time in March this year, now in Gstaad in Switzerland. The topic of the meeting was the development of possible joint activities and actions. The meeting was well attended by partners and was very productive

Stakeholder Analysis on a National Level

The **Stakeholder Analysis** aims at identifying and listing the main stakeholders and assessing their interest and attitude and how they are likely to impact / be impacted by the work of funding agencies and geothermal program owners. It is important to highlight the fact that the partners of the ERA-NET project, are affected by other national stakeholders. The collection of data of national stakeholders and the related analysis can be summarized as follows:

- The stakeholder lists and analysis differ strongly between countries. This is mostly related to the local availability of resources and energy demand.
- Depending on the local situation, the national RD&D has developed in different directions.
- Concerning the proposed actions there are some general findings which are valid for all partners.

The next step will be to extend the stakeholder listing and analysis to regional and European level.

ERA NET PARTNERS

The Consortium represents National and Regional programmes from 10 European countries, giving the Geothermal ERA-NET the critical mass required for successful operations. All members have assigned senior staff to this ERA-NET and most of the representatives from the different partners have beyond their responsibilities for the home front programmes experience in international cooperation and ERA-NET's in particular.

List of partners:

Iceland - OS (Orkustofnun) (Coordinator)
http://www.nea.is/

Iceland - RANNIS (Icelandic Centre for Research)
http://www.rannis.is/

The Netherlands - Rijksdienst voor Ondernemend Nederland
http://english.rvo.nl/

Switzerland – SFOE (Swiss Federal Office of Energy)
http://www.bfe.admin.ch

Italy – CNR (The National Research Council of Italy)
http://www.cnr.it

Germany – Jülich (Project Management Jülich)
http://www.ptj.de

France - ADEME (French Agency for Environment and Energy Management), BRGM as third party of ADEME
http://www.ademe.fr

Turkey - TUBITAK (Scientific and Technological Research Council of Turkey)
http://www.tubitak.gov.tr

Slovakia MESRS (Ministry of Education, Science, Research and Sport of the Slovak Republic)
https://www.minedu.sk/about-the-ministry/

Hungary – HGGI (The Energy Efficiency, Environment and Energy Information Agency)
http://www.mfgi.hu

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