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DILEMMAS OF GEOTHERMAL PROJECTS IMPLEMENTATION IN SOME POLISH CITIES

Abstract

In the article attitude of certain self-government bodies in Poland regarding the use of geothermal energy was discussed. In the synthetic way some development barriers of geothermal energy in Poland were described and factors which have a bearing on making a decision to build the geothermal objects were characterized. An issue of the economic profitability, as well as importance of geothermal energy for the development of a city were also emphasized. Using the example of geothermal energy effects made in the small town of Uniejów, the author in the synoptic presentation described predicted benefits to the development of Zduńska Wola town.

JEL Classification Codes: **Q42, Q57.**

Keywords: geothermal projects, geothermal energy.

Introduction

Poland has abounding sources of the geothermal energy, suitable for direct use. Around 80% of the country area lies in three geothermal areas: central-European, before-Carpathian and Carpathian. The range of water temperature for these areas based on estimated studies is 30–130°C depending on the depth of the deposit.

„A geothermal energy is a warmth obtained the depths of the earth as hot water or steam. It is used directly as the heating energy for the needs of communities and in production processes, as well as for generating the electric energy (by using dry steam or high enthalpy brine)” (GUS, 2015). Development of geo-

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thermal energy in Poland faces many barriers that significantly limit the use of geothermal waters, not only for the development of heating sector but also for use in farming, balneotherapy, recreation etc. Amongst many barriers in the development of geothermal energy like: inadequate regulations, amount of fees and taxes, political barrier is one of important barriers – using „Geothermal energy” for the political strife, not only by the ruling camps, but also by self-government officials).

In 2009, in the total balance of acquiring energy from renewable sources RES, the geothermal energy constituted the 0.2%. In 2014 the volume increased only up to 0.25%. This data may indicate, how this energy source is undervalued or faces barriers of different kind.

In figure 1 the increase in the participation of RES energy in the general energy balance of Poland in years 2010–2013 was presented.

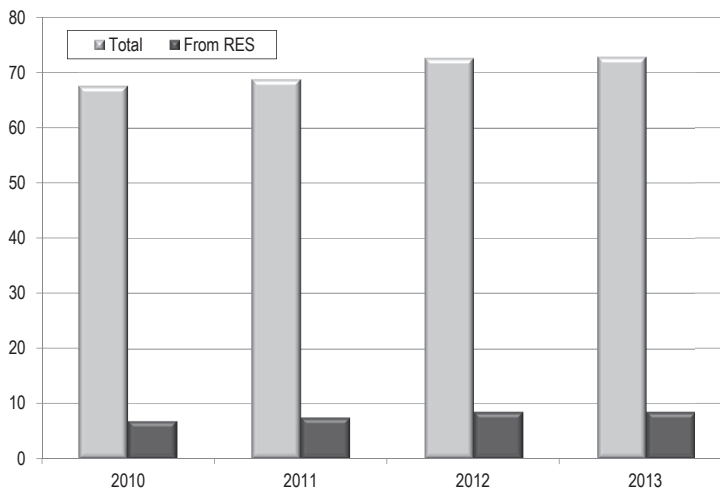


Figure 1. The participation of RES energy in the general energy balance of Poland in years 2010–2013

Source: Own work on the basis of GUS date.

Exploiting the energy from renewable energy sources in the general energy balance of Poland is small.

A geothermal energy has even a smaller participation in general RES balance. Percentage participation of individual RES energy types in 2014 was presented in figure 2.

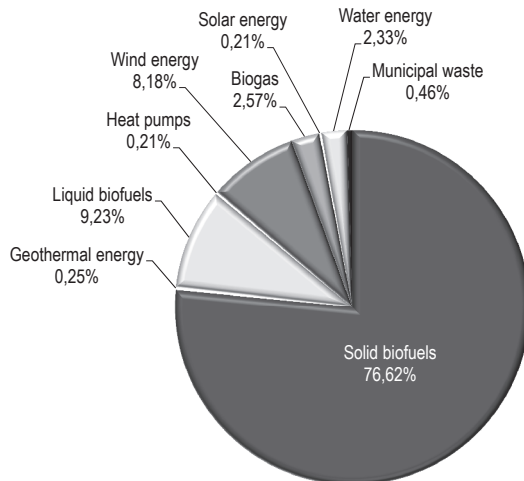


Figure 2. Acquired RES energy in Poland in 2014 according to fuel type

Source: GUS date.

Basic barriers of geothermal energy development in Poland and their influence on investment decisions

Difficulties had a high impact on development of use the energy of geothermal waters, which did not allow satisfying development of geothermal energy. Existing legal and economic barriers were the main development brake. Many communities in Poland drew attention of governing officials to „difficulties of geothermal energy development in Poland” (Kępniska, Tomaszewska, 2010) which included:

- provisions of law and financial conditions not-supporting investing;
- complicated and long legal and administrative procedures (causing delay in activating funds for investments, fall in their value, discourage investors);
- many charges and taxes (which has an impact on the heating price);
- lack of necessary incentives and economic instruments, including the lack of the Geological Risk insurance Fund and „green certificates” to the geothermal warmth („green certificates” in accordance with the Energy Law are support mechanisms of generating the electric energy from renewable sources. The property rights resulting from the certificates of origin are transferable and constitute stock exchange goods. There is a lack of such a system in relation to generating the warm weather from RES);
- lack of independent entity coordinating support of publicly funded projects (best and most economically profitable classified by external experts); high set-up costs (drillings, studies and specialist services).

Until 2009–2011 in Poland procedures were simplified and conditions of obtaining the concession were cushioned, charges for using thermal waters were liquidated, charges for geological information for design purposes were reduced (Przybycin, 2011) and support for geothermal projects from National Fund for Environmental Protection and Water Management funds was provided.

Taken actions and their continuation turned out to be essential, even more so as results from figure 2 use of geothermal waters in Poland is unusually small compared with use of other energy types.

The Act modified by the Law of February 2015, concerning state support for RES, introduces next changes. Technologies which provide the energy generation in the predictable way, including geothermal energy will receive the highest support. Technologies enabling to acquire the energy from the wind and sun will receive smaller support. In June of this year Polish Senate entered amendments into the Law on Renewable Energy Sources.

Apart from listed barriers and actions for their liquidation there is a barrier of the political nature, for which provisions can't solve. In many cases this barrier has the strongest impact on decision making about geothermal energy use. There are many examples, where the politics took the place of economic imperatives. Good examples of such political decisions are Geothermal Energy in Toruń, Gostynin, Lidzbark Warmiński, Pabianice, Zduńska Wola (Karsznice Geothermal Energy).

Case of Geothermal Energy in Toruń has been well-known since 2007 when National Fund for Environmental Protection and Water Management granted the project of building the geothermal energy by Veritatis Lux foundation in amount of 27 million PLN. The grant was withdrawn without substantial reasoning. Geothermal water in Toruń has high parameters and can be used in the health care as well as in heating.

In Gostynin as part of geothermal waters use was to be built thermal „Disneyland”. This object was supposed to be unique in Europe. For that purpose the city signed the pre-agreement with the Voivodship Office for co-financing of project with amount of 72 million PLN. Like in Toruń after the change of the government in 2007 Gostynin didn't receive the funds. In both cases in Toruń and in Gostynin as part of projects only wells were drilled.

Other, opposite to cases from Toruń and Gostynin example of the coherent action of the authority is support of Geothermal Energy structure in Lidzbark Warmiński. Warmian Thermae are economically unprofitable investment as the geothermal water temperature is exceptionally low and amounts around 21°C. Water with such a temperature cannot be used in heating, and using it in swimming pools must be heated. According to the estimates the annual cost of water heating will amount around 800 thousand PLN. Thermae, in spite of controversy about their building were opened in 2014 although the construction

wasn't finished. Designed building cost amounts around 93.5 mln PLN, including the 64 mln PLN EU funds.

In 2013 according to the announcement of Polish Press Agency: „Ministry of Regional Development will verify documentation concerning the structure of Warmian Thermae in Lidzbark Warmiński. Investment is highly controversial, because thermal waters which will fill swimming pools, have a temperature a little bit above 20 degrees. and will require heating” (Polish Press Agency, 2016).

„Therme has been built for three years. As was originally announced they would have been ready in 2014, during the investment the main contractor went bankrupt. For this reason the district office had to announce new tenders for completing works. Lidzbark Warmiński Therme are one of the most expensive EU investments in Varmia and Mazury. The cost of their structure is estimated at over 93 mln PLN, but – according to local media – can be higher for next 12 mln PLN”. (Kurs, 2015).

Like in case of Warmian Therme that arose from politically motivated decision, in Pabianice there won't be Geothermal Energy also for political reasons. Governing coalition under the conflict concerning the structure of Geothermal Energy broke down. Economic benefits and a public demands weren't taken into consideration.

Geothermal Energy Project in Pabianice assumed two variants of financing (Kozłowski, 2015):

- private funds,
- EU funds from the Marshal's Office in Łódź and Commune of Pabianice, Commune of Ksawerów and County Office's own funds.

Moreover boreholes in Jadwinin performed at a depth of 1500 meters have high parameters of water – temperature above 50°C, are enough for implementation of rest and recreation investment project. Making boreholes at a depth of 3 km according to estimates allows to get water with temperature of about 134°C. Such a water temperature is also enough for its use heating – in flats' heating.

It is significant that professor Ryszard Kozłowski from Cracow Technical University estimates, that „near Pabianice there are 200 million tonnes of fuel units, while entire Poland consumes 100 million tonnes annually”. That's his statement from this year.

In Zduńska Wola just like in Pabianice there won't be Geothermal Energy. The political factor was also crucial here. Nimble manipulation of the town's authorities – a different political option which took power in 2008 led to discontinuation of highly advanced project of building Geothermal Energy in Karsznice. The town's authorities decided to reconstruct the town hall destroyed during the World War II and built it without any public consultation. A brand new object which did not resemble the pre-war town hall was built. The object doesn't performed its old town hall function.

Case study based on effects of Geothermal Energy in Uniejów

This case study, describes the development of a small town Uniejów placed by the Warta River in the Łódź district, where by investing in the development of geothermal infrastructure has been a substantial improvement in life of the commune inhabitants. In particular a rise in the tourism activity contributed to this improvement. The author in the synthetic way discusses particularly significant steps in progress of Uniejów Geothermal Energy development and its impact on town's development.

Uniejów is placed in the north-western part of the Łódź district by the Warta River. It has 3200 inhabitants and covers an area of 129 km² along with the Uniejów commune. This region constitutes area of typically agricultural character. Connections with Łódź (56 km), Turek (2 km), Konin (51 km) are the main communication – transport routs. The town economically similar to other towns in Poland, in 1999 decided to establish the „Therme Uniejów” Sp. z o.o. company, which would use geothermal waters in the heating. Structure of geothermal energy for heating purposes with use of geothermal water sources was donated by National Fund for Environmental Protection and Water Management in Łódź.

In the framework of successfully growing geothermal infrastructure in Poland, in 1999 a company Geothermal Energy Uniejów Sp. z o.o. was established. Its main shareholder is Uniejów Commune (58.8%), and National Fund for Environmental Protection and Water Management in Łódź (41.2 %).

In 2000, town's authorities decided to begin construction of the heating system called „Insulation of Uniejów town based on thermal waters”. The program's main goal was to establish heating system which would provide heating for public utility buildings like: schools, Teachers' House, kindergarten, The Commune Cultural Centre, a church, a presbytery, „Geothermal Energy Uniejów” Sp. z o.o. company building, a health centre, pharmacies and council and cooperative blocks of flats, single-family houses. Finally about 170 supply connections were successfully implemented. However using geothermal energy for heating, brought losses. Too small demand on „warmth” and company financial liabilities arising from the necessity of loan redemption taken to the cost recovery in relation to the loss caused by the sale of thermal energy at an excessively depressed were the main factors causing the losses. The estimated cost of producing 1 GJ of the warmth amounted about 85 PLN, while realizable maximum price for the sale of this unit amounted about 40 PLN.

In order to improve company profitability, in 2002 a research on geothermal water use at healing targets was undertaken. In order to ensure financial equilibrium the commune decided to build water recreation complex called „Therme Uniejów”, which should function entire year – through an open-air swimming pool with three swimming pools with geothermal water. The commune authorities received for this task funds from the European Union. The investments were

divided in two parts. Part of investment was completed in 2008, and the whole investment in 2011. One year later Uniejów gained the official status of health resort.

Since 2010 „Geothermal Energy Uniejów” company has made the slight loss in the average amount of 200 thousand per year. Advantageous occurrence is the company's income grow which is a good sign for the company's future. Figure 3 presents the company income in 2010–2014.

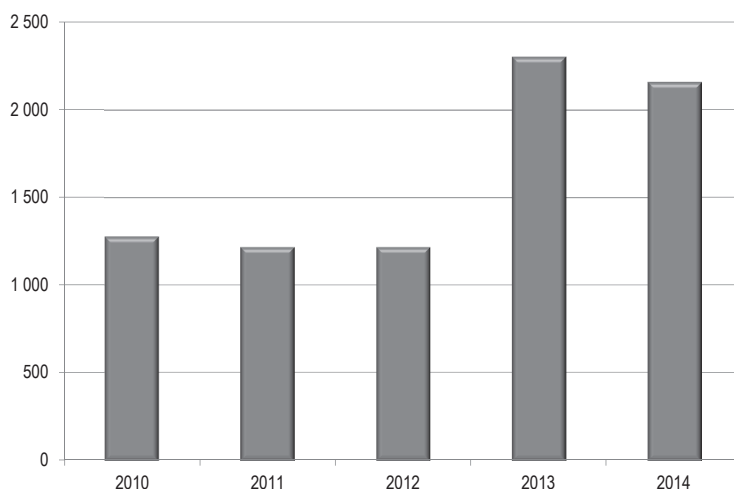


Figure 3. Geothermal Energy Uniejów sp. z o.o. incomes in 2010–2014 (thousand PLN)

Source: the profit and loss account of Geothermal Energy Uniejów sp. z o.o. in 2010–2014.

In relation to implemented program, Uniejów the town, apart from basic benefits achieved the recognisability on the tourist map of Poland as the spa city.

The basic advantages of the geothermal investments implementation include first and foremost:

- improvement of the town image,
- creating the only heating system in Poland that uses entirely renewable deposits,
- revitalizations of urban areas,
- town's development for the spa & health care purposes,
- create new jobs ,
- population increase,
- increasing the commune residents profits from accommodation rentals.

Even though Uniejów is a new spa & health care town, the first years of functioning of the tourism seem to be a promising and is promising well for the future. In 2009 there was only one place which offered only 49 accommodation places. Later new establishments providing hotel services were build and now can serve a great number of tourists.

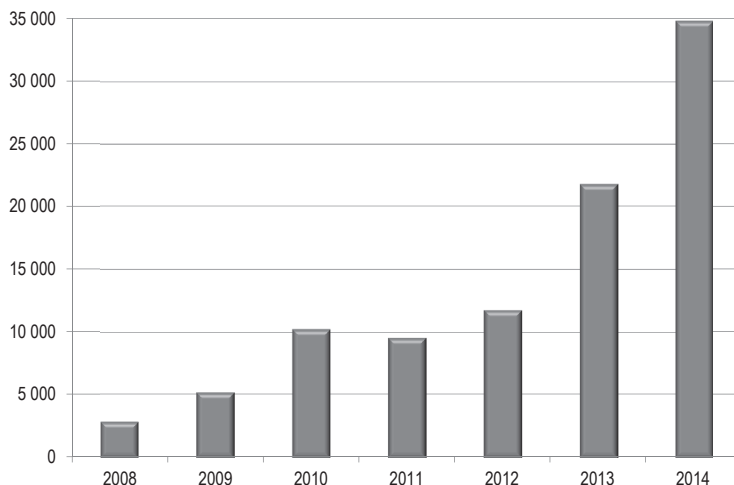


Figure 4. Number of tourists visiting Uniejów in 2008–2014

Source: own studies based on GUS date.

In 2008, 2856 tourists visited Uniejów and in 2009 the number of tourists rose up to 5153. There were 9367 tourists in 2011, and in 2014 Uniejów was visited by nearly 35 thousand tourists. The increase was presented in picture 4.

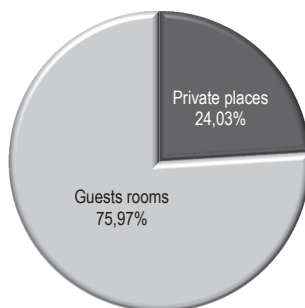


Figure 5. Number of accommodation places in Uniejów according to state of March 2013 in the division into private rooms and objects of the group accommodation. Number of residents from Poland using accommodation in objects of the group accommodation

Source: own studies based on GUS date.

It should be noticed that within five years the number of tourists increased by as many as 340%. However Number of overnight stays in the same period rose by 440%.

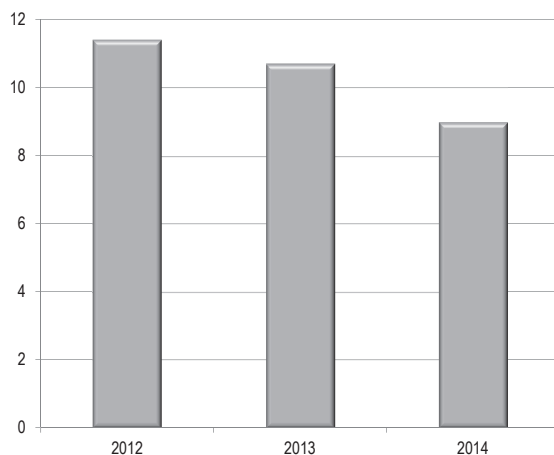


Figure 6. Unemployment in Uniejów in 2012–2014

Source: own studies based on GUS data.

A state of the unemployment in Uniejów and its connection with the development of tourism are interesting. The presented in picture 6 graph shows clearly the decreasing tendency of unemployment what undoubtedly is due to geothermal energy development in Uniejów.

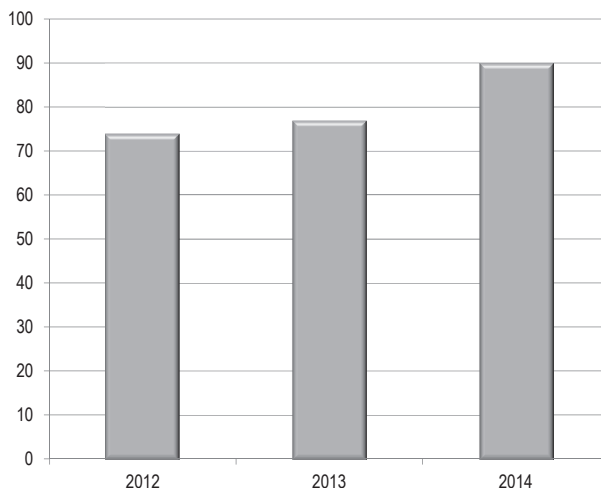


Figure 7. Number of working people to 1000 of population in Uniejów, without business entities about the number working to 9 persons and privately owned farms

Source: own studies based on GUS data.

In relation to gradual implementation of the program suggested by Uniejów authorities, the town gained the title of the spa, thus joining the group of 45 spa centres in the country. A new town's position and its residents was possible mainly thanks to a harmonious team of people and town authorities who were able to create conditions and the development strategy of the town for the future. Such actions had a significant impact at improving the quality of life of the commune inhabitants, through the accretion of tourism in the town, an economic boom, increase public income, activity of residents, a rise in profits from trade and services and fall in unemployment. This in turn translates to a number of benefits, affluence of the area residents and maximize the opportunities which were created for them by geothermal investments.

Amongst other positive aspects of growing tourism we should underline more than a threefold growth in number of tourists visiting Uniejów, in just three years. In the corresponding period a number of the employed also rose, while the unemployment was lower by 2.4 of percentage points what in the situation of the small town is a success of its authorities and is measured positively.

One of the main conclusions that can be drawn after the analysis of analysis of Geothermal Energy Uniejów company's situation is basic. geothermal Energy in a small town won't be the investment that ensures the appropriate level of profitability, if is targeted exclusively at exploiting the energy of thermal waters in the heating. Therefore actions of use of geothermal waters must include a wide range of services: heating and healing services as well as the industrial production e.g. cosmetics.

Case study of exploring the geothermal energy for designed Geothermal Energy in Karsznice

The example of the wrong attempt at planning to use of geothermal waters in Poland is a self-government in Zduńska Wola, located on hot, thermal, water deposits.

The case study was based on: Feasibility Study for Obtaining the Geothermal Energy within the town Zduńska Wola – Geothermal Energy Karsznice (Polgeol, 2007); The project of geological works for recognizing and substantiating reserves of waters from the early-Jurassic level in Zduńska Wola (Polgeol, 2008); Feasibility study for heat supply of existing buildings belonging to Karsznice housing estate in Zduńska Wola, based on thermal energy of geothermal waters. Moreover a report prepared by the Management Board of Miejskie Sieci Ciepłe Sp. z o.o. from February 2, 2009 was used (Piotrowski, 2009).

Karsznice is a very old town known since the 14th century In the study Karsznice history up to beginning of the 20th century was omitted , when in 1928

a main railway line connecting North and South and crossing Karsznice was built. The line was used to transport coal from Silesia to Gdynia. In November 1930 in Karsznicach a railway station was opened, in 1933 a locomotive shed was built, and then residential area for 1300 railwaymen and their families was built. The company which carried investments out was French.

After the war the Workshops for Railway Equipment of the Polish State Railways was extended and modernised. In 1959–1972 Karsznice had the status of housing estate. Since January 1, 1973 Karsznice have been a part of Zduńska Wola town.

During the political transformation, after 1989 Karsznice stopped being an important railway junction. Polish National Railways, as the owner of the considerable industrial assets in Karsznice limited its activity practically to „zeroes”. About the former Karsznice magnificence resembles the open-air ethnographic museum of the rolling stock, in which, combustion and electric steam engines from the 1st half of 20th century are presented.

At present Karsznice is a calm, forgotten by town authorities inhabited district with 4000 residents, without workplaces, depended on its residents ingenuity who have acted as a Local Government Unit in Karsznice since February 27, 2003. Unfortunately the Community activity is controlled by the town hall and doesn't include pro-economy activities. Its role is limited to popularizing self-government ideas and taking the local initiatives with exclusion of economic and industrial initiatives (Statut, 2003).

So residents influence via their Community in the scope of planned in 2008 Geothermal Energy was limited and authorities did not take account of common wealth that Geothermal Energy could become for Karsznice and Zduńska Wola. After giving up the construction of Geothermal Energy Karsznice, in March 2010 the Union for the Construction of Geothermal Energy in Karsznice was created. The union interested town authorities with the Geothermal Energy, however no effect were achieved. Authorities just like previously created only an illusion of geothermal energy construction. The mayor words written down by local media attest to it (Jeziorska, 2010).

In April 2007 „Feasibility Study for Obtaining the Geothermal Energy within the town Zduńska Wola – Geothermal Energy Karsznice” was prepared (Polgeol, 2007). In March 2008 „The project of geological works for recognizing and substantiating reserves of waters from the early-Jurassic level in Zduńska Wola” was presented (Polgeol, 2008).

The town's self-government body entrusted Miejskie Sieci Ciepłne Sp. z o.o. heating company the task to build the geothermal energy in Zduńska Wola. Environmental positive opinions and audits drafted at the Ministry of the Environment for the versatile application of geothermal energy were received. Also the company received concession from the Ministry of the Environment for the

geothermal boring out, and the company and the city protected adequate financial means. However at the end of 2008, after the change of the chairman of the management board, the company (new management board) made the analysis of the use of geothermal waters again but this time exclusively for the Karsznice heating. They conducted superficial and imprecise calculations, experts opinions and examples of using thermal waters in Poland carried out successfully were ignored. Omitting well known, universal NPV and IRR methods for assessing effectiveness was a basic mistake while evaluating the planned investment. In 2009 as the effect of such an approach of the new company Management Board was discontinuation of further actions. To this day town's heating problems haven't been solved, even though Zduńska Wola is on the 29 for place amongst 33 the most polluted Polish cities in the EU (WHO Report, 2016). The report regards 50 European cities.

Zduńska Wola is heated by Heat Plant in Zduńska Wola, which sells the heat to towns heating company. The technology based on coal doesn't support residents and isn't cheap at all. Individual sources of the heating have Karsznice.

The plan of the building „Geothermal Energy Karsznice” in Zduńska Wola was created in 2007. Zduńska Wola has conditions for geothermal energy development, which include:

- adequate sources of geothermal waters,
- very well extended heating distribution network with service wires in the town,
- potential users of the geothermal energy in Karsznice,
- convenient geographical conditions (central Poland),
- convenient transport connection with Łódź, Warsaw, Wrocław, Poznań,

Moreover there are many centres in the country, which „blazed a trail” towards the building of geothermal objects thanks to:

- the high level and involvement of academic environment,
- designers experience, drill and geophysical companies, technical contractors,.

Additional incentive towards the geothermal energy development is the need to implement EU commitments regarding RES, sustainable energy development, etc.

Geothermal Energy in Zduńska Wola found the a prominent place in investment plans of Miejskie Sieci Ciepłne Sp. z o.o., (MSC). One of the driving factors to work on the project was the town council resolution which allocated 2 million PLN for the purpose and passed the money from the town budget to an increase in capital of MSC. Altogether the MSC company collected 7.5 million PLN which were basis for applying in National Fund for Environmental Protection and Water Management for subsidizing test drilling and funding further works. Having the significant, not-used potential of energy from geothermal waters in Zduńska Wola was the second factor. According to estimates under the town there are deposits of water with temperatures from 20 to 80-120°C degrees.

This advantage creates prospects of the energy application of geothermal energy in Zduńska Wola directly as heating energy for public needs and in balneology, health care, production processes, in farming, as well as for generating the electric energy. The geothermal project has a big chance to be profitable mainly because the power needed for ensuring the warmth in Karsznice is 2.5–3 MW, and at forecast productivities of the hole it is possible to get 4.6 MW from one duplicate, so about 50 % more than demanded. What is more, scientists predict that water in Karsznice will be geothermal mineralized with the value of 120 g/l. These are sodium chloride, iodine waters.

Admittedly the MSC company carried out an analysis for the location of geothermal holes in Karsznice, where it is possible to supply 1600 families into the warmth, geothermal energy location in the centre of the town, close the network and central heating consumers provided at present by the MSC company wasn't considered. Zduńska Wola (without the Karsznice housing estate) has a well-developed heating distribution network, with concentrated building development and the sufficient number of customers. The length of heating network is 40 218,50 running metres. Additional advantage of the town centre is a fact of having by the self-government body areas fulfilling needs for the geothermal energy location. Exploiting the geothermal power in these places can bring not only economic, but also environmental benefits.

Geothermal Energy Project implementation in Karsznice, and in the following years in Zduńska Wola would also raise, in the distinct way residents safety concerning the supply of heat through the diversification of energy sources. Moreover, it should be noted that geothermal energy is available entire year, so can satisfy the base demand for the central heating. Unit heating price from geothermal energy is close to the price of heating from natural gas, however contrary to gas it guarantees the price stability. According to Energy Regulatory Office data in 2012 average heating price in Poland, produced from gas sources, amounted 88 PLN gross per gigajoule. The price from geothermal energy amounted 65.78 PLN per gigajoule.

MSC Zduńska Wola in 2015 carried costs in amount of 61 PLN/GJ. However apart from this price the customers had to pay profit margins, which is added to the purchase price of each GJ of the energy from Heat Plant in Zduńska Wola (Energy Regulatory Office, 2012).

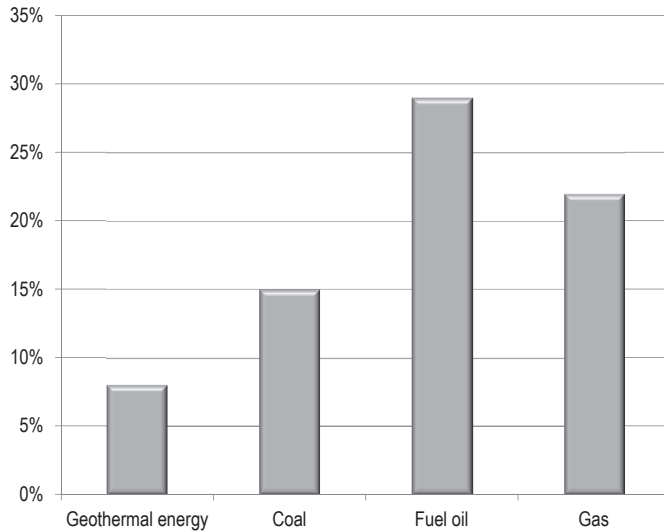


Figure 8. Percentage growth in heating prices in Poland in 2007–2013 according to fuel type
Source: Energy Regulatory Office Data from 2007–2013.

Conclusions

In Poland there are different circumstances supporting the geothermal energy development, which include:

- large resources of geothermal waters and energy,
- potential central heating consumers and users of leisure and healing centres ,
- the high level and involvement of academic environment,
- designers experience, drill and geophysical companies, technical contractors.

In spite of such numerous pro-development circumstances decisions on the structure of geothermal energy in Poland are made hardly and rarely. Among situations presented in the article concerning motives for taking investment decisions – geothermal energy construction – in all sorts of self-government bodies there is one basic conclusion, that very crucial for concrete decision making regarding the use and the way of developing geothermal waters is not the economic profitability – the productivity of mining holes, the water chemistry or its mineralization or the possibility to apply it in heating, health care or recreation – but above all political factor is crucial. It is a shocking observation.

The second factor affecting the decision making is falsely formed conviction about high costs of geothermal energy compared with other energy sources. Quite often this argument finishes all discussions.

The third factor which has currently passed, was the act on renewable energy sources, which regulations were disadvantageous for geothermal energy like e.g.

fiscal and grant policy. This lack of interest of geothermal energy by the public authorities has also caused the lack of interest of geothermal energy development by self-government authorities and investors.

Structure of geothermal energy for the local community should be based on a few premises, which should include:

- 1) good understanding of hydro-geothermal parameters in Poland.
- 2) possibility of using experience of Polish installation, exploitation and search companies within PGNiG frames,
- 3) the lowest investment expenditure per unit of energy produced from RES sources.
- 4) unit net price of purchases of heat from geothermal energy which is not fundamentally different from heating prices of coal-fired power plants.

Table 1. Comparing the total capacity of heating plants in some Polish cities including the participation of the geothermal energy

Geothermal Energy	Power demand	Power from geothermal energy (MW)	Participation of the generated power from geothermal energy (%)
Uniejów*	7,4	3,2	43
Mszczonów**	7,5	2,7	36
Karsznice	3,6	4,6	127

* The structure geothermal heating plant in Uniejow let to reduce the number of dust and gas pollutants transmitted to the atmosphere (lack of accurate data). ** Geothermal Energy in Mszczonów contributed to eliminate 4.5 thousand tonnes of previously burnt fuels per annum. This fact caused the SO₂ emission reduction by 100%, NO_x by 82%, CO by 98%, CO₂ by 75%, soot and dust by 100%.

Source: own study based on data from town: Uniejów, Mszczonów and Zduńska Wola.

Carrying out investments associated with use of geothermal waters, fairly comprehensive and quite fast development of a town economic, environmental and social effects should be expected.

It is worth mentioning that using existing PGNiG acquis in exploration works conducted for decades will allow to release capital invested in these works. It will undoubtedly be a benefit with major importance to a country.

Comparing benefits that a small town Uniejów or bigger Mszczonów has achieved, to predicted benefits, which could be achieved as a result of the geothermal energy structure in Zduńska Wola, it isn't possible to refer in numbers, without conducting appropriate research. Based on presented examples and existing studies concerning geothermal energy it is only possible, in the vague way

to predict the influence of geothermal investments on the development of the local community. Development, of which components will be following benefits:

- growth in number of sale and service enterprises, restaurant, hotels, healing plants,
- fall of unemployment,
- lowering the release of pollutants,
- safety resulting from the constant access to energy sources,
- hold up the progressing depopulation of the town and growth of population,
- residents profits from tourist accommodation services,
- improvement of the city's image,
- an increase in the city's incomes.

Correcting specialists studies is a basic mistake of local government officials as happened in Zduńska Wola in December 2008, where the preliminary version of feasibility study was presented. The Orderer, that is MSC Sp. z o.o. instructed to take feed and return parameters of 80/60°C for operating temperature -18°C for further calculations and analyses. For the above reasons it has become necessary to construct a boiler house for heating geothermal water. It should be noted, however, that according to opinion of this feasibility study authors, option of the geothermal heat plant supported by the boiler house which at present is being considered is not optimal.

As indicated by simulations included in the study, water about parameters 55/35°C and the predicted network flow $Q = 130 \text{ T/h}$ fully will satisfy the heating demand of Karsznice housing estate, and so construction of the supporting boiler house wasn't necessary. This way the wrong decision made by MSC management board increased building costs of geothermal energy by over 4 million PLN. It may be assumed that the company prefers to defend its status quo than to develop itself or it is comfortable for the company to be an intermediary rather than a producer of the central heating.

The second mistake at decision making regarding the investment was to plan the use of geothermal energy only in heating with omitting use of heat and geothermal waters for other production-services and balneology purposes.

These are benefits of investment for the local community that must decide on investments, rather than politically motivated decisions, based on harmful principle – „the predecessor's project was bad, and mine was good”.

One of main demands while decision making about the local government investment project implementation is the necessity to follow profitability of investment calculated with the use of proven methods (NPV and IRR), as well as with acquaintance of geological specificity of the location.

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