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LEGAL REGULATIONS ASSOCIATED WITH THE USE OF LOW TEMPERATURE ENERGY FROM MINE WATER

Wachowicz-Pyzik A., Mazurkiewicz J. **Regulacje prawne związane z niskotemperaturowymi systemami opartymi na wodach kopalnianych.** Energia geotermalna jest obecnie wykorzystywana w Polsce zarówno w celach ciepłowniczych, rekreacyjnych jak i balneologicznych. Dowodem na to są działające ciepłownie geotermalne, jak również liczne geotermalne centra rekreacyjne i balneologiczne zlokalizowane na terenie całego kraju. Chociaż pozyskiwanie wód termalnych związane jest głównie z głębokimi otworami wiertniczymi lub systemami pomp ciepła, które wykorzystują płytkie warstwy wodonośne (na mniejszą skalę w porównaniu do ciepłowni geotermalnych), istnieją również inne sposoby uzyskania ciepła z wód podziemnych związane z wodami kopalnianymi obszarów górniczych. Artykuł stanowi przegląd najnowszych dostępnych źródeł na temat regulacji prawnych określających wykorzystanie energii geotermalnej z wód kopalnianych i zatopionych wyrobisk górniczych. Dodatkowo omówione zostały możliwości wsparcia finansowego dla inwestycji związanych z niskotemperaturowymi instalacjami pomp ciepła.

Вахович-Пызык А., Мазуркевич Ю. **Правовое регулирование низкотемпературных систем, основанных на шахтных водах.** Геотермальная энергия в настоящее время используется в Польше, как для отопления, так и в целях отдыха и курортного лечения. Основными формами практического использования являются геотермальные системы централизованного теплоснабжения, а также многочисленные геотермальные базы отдыха и центры курортологии, расположенные по всей стране. Основные способы добычи термальных вод, в основном, связаны с бурением глубоких скважин или применением систем тепловых насосов, использующих неглубокие водоносные горизонты (в меньшем масштабе по сравнению с геотермальными установками). Однако, существуют и другие способы получения тепла из подземных вод, связанным с использованием шахтных вод в горнодобывающих районах. В статье представлен обзор последних доступных источников по правовым нормам, регулирующим использование геотермальной энергии шахтных вод и затопленных горных выработок. Дополнительно рассмотрены возможности финансовой поддержки для инвестиций, связанных с низкотемпературными установками тепловых насосов.

Key words: geothermal energy, legal regulation, low temperature systems, mine water

Słowa kluczowe: energia geotermalna, regulacje prawne, systemy niskich temperatur, wody kopalniane

Ключевые слова: геотермальная энергия, правовые регулирования, низкотемпературные системы, шахтных воды

Abstract

Currently, the geothermal energy is used in Poland both for heating, recreation and balneology purposes. Evidence of this are operating geothermal heating plants as well as numerous geothermal recreational and balneology centres located throughout the country. Although the acquisition of thermal water is mainly related to deep boreholes or with heat pumps systems, which use shallow aquifers deposits on a smaller scale, there are also other ways of obtaining heat from groundwater related to mine waters and mine areas. The most recent review of available sources on legal regulations determining the use of geothermal energy in the form

of low-temperature thermal energy derived from mine waters and submerged mine workings, were presented. Additionally, the current possibilities of financial support for investments related to the acquisition of heat from groundwater, were discussed.

INTRODUCTION

Geothermal energy, classified as renewable energy source, despite the increasing popularity of geothermal plants, as well as recreation or balneology centers which commonly use underground water, is on the marginal position in comparison with other re-

newable energy sources. In recent years, the faster development of geothermal energy was connected with the heat pumps installations appearance on the Polish market. Heat pumps use low-temperature source for the production of thermal energy but on a smaller scale than it takes place in geothermal plants.

According to data from the Central Statistical Office, the largest increase in energy from heat pumps occurred between 2007 and 2008 year. Currently, this share is maintained at the level of 0.3% in comparison with other alternative sources as it is shown in fig. 1.

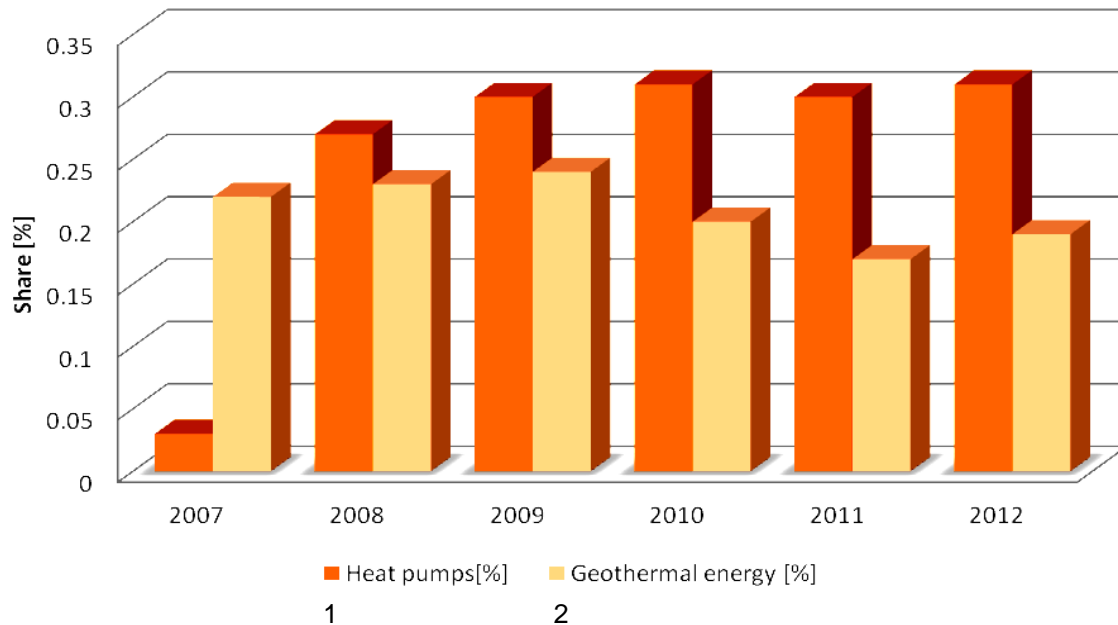


Fig. 1. Percentage of the heat pumps and geothermal energy utilization in the 2007–2012 (BERENT-KOWALSKA et al., 2013)
 Rys. 1. Procentowy udział instalacji pomp ciepła (1) i energii geotermalnej (2) w latach 2007–2012 (BERENT-KOWALSKA i in., 2013)

New alternatives, associated with geothermal energy, are the waters derived from the mine workings (both active and closed). In Poland, where the energy sector is based largely on coal and lignite, the ability to use water coming from the mine workings appears to be a good alternative to reduce pollution in degraded areas, where there are no natural conditions for obtaining heat from the groundwater due to the temperature and the poor geothermal parameters.

The purpose of this article is to present the current legal regulations in Poland, under which it is possible to use groundwater from the mine waters, water from mine drainage and embedded mine workings in low temperature systems.

THE LEGAL REGULATIONS IN POLAND

The main legal regulations presently forming the possibilities of groundwater utilization in Poland include the Acts (MUCHA, 2011):

- Geological and Mining Law (Journal Laws of 2005, No. 228, item. 1947 with amendments),
- Water Law (Journal Laws of 2005, No. 239, item. 2019 with amendments),

- Environmental Protection Law (Journal Laws of 2008, No. 25, item. 150 with amendments),
- Building Law (Journal Laws of 2010 r., No. 243, item. 1623 with amendments),
- Freedom of Economic Activity (Journal Laws of 2010, No. 220, item. 1447 with amendments).

Geological and Mining Law provides guidance relating to both, the exploration and recognition of the groundwater – including waters whose temperature at the outlet does not exceed 20°C. The possibilities of using groundwater are also determined in Water Law, which defines groundwater as the water beneath the Earth surface in the saturation zone, including groundwater in direct contact with the ground or subsoil. Although the Water Law is not applied in the case of the exploration and recognition of groundwater in case of brines, therapeutic or thermal water, and water coming from the mine areas. It should be noticed that in the case of the system, whose exploitation of groundwater exceeds 10 m³/h, a decision on environmental conditions due to the Environmental Protection Law must be obtained – because that kind of investment may have a negative impact on the environment. Moreover, in the case of extraction of thermal waters under the

Act of 2 July 2004 on Freedom of Economic Activity, and in accordance with the Geological and Mining Law, thermal waters are classified as the basic minerals, which entails the need to obtain a license for the exploration and recognition purposes.

Considering the legal aspects of the investments related to the energy from groundwater, potential investors must face a number of complicated legal procedures, which can negatively affect projects by growth of the costs of the investment, as well as the time of its realization. While the current legal situation, related to obtaining the permissions from appropriate state authorities, have improved significantly in recent years, in the case of mine waters situation is more favorable. According to the Water Law, water derived from the dewatering of mine areas is classified as waste water. Furthermore, Geological and Mining Law does not classified waters as minerals, except for the therapeutic waters, thermal

springs and brines. It should be noted that the thermal water according to the Act, is the water that has at the outlet temperature not lower than 20°C. Moreover, the Act exempts from additional fees such installations which use mine waters to satisfy the mining plant needs. Taking into account both the legal regulations and the fact that mine waters temperatures rarely exceed 20°C, obtaining heat from mine waters does not involve additional fees. Further advantages of groundwater utilization from abandoned mine workings is the fact that in order to obtain the heat it is possible to use the existing infrastructure such as mine shafts, mine workings, or existing boreholes.

The low-temperature geothermal systems based on heat pumps can be divided in two main types of low-temperature systems: closed and open, which are regulated by different legal documents (fig. 2).

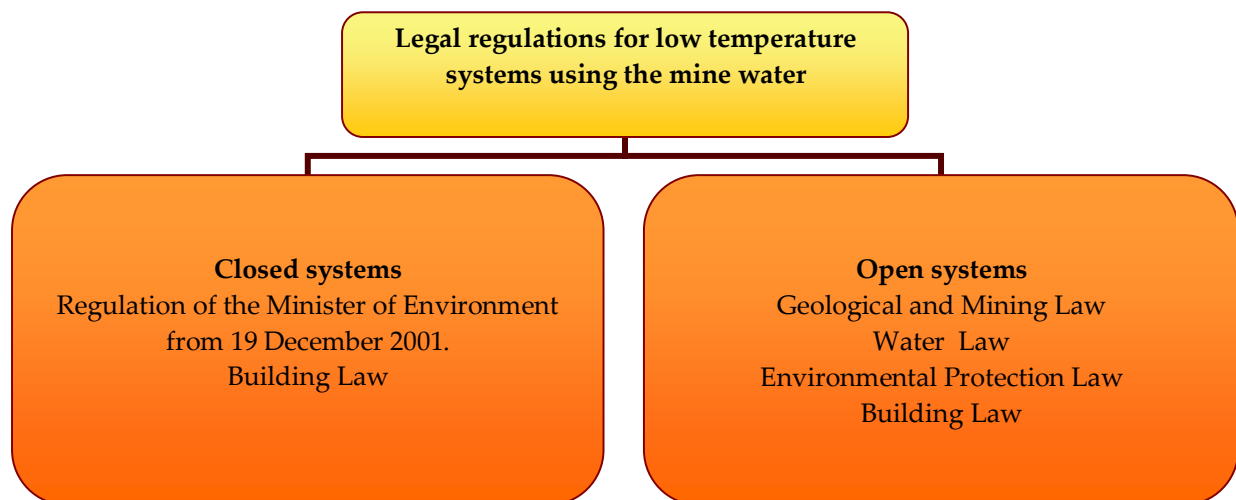


Fig. 2. Legal regulations for systems using the mine water with two types division
Rys. 2. Podział obowiązujących regulacji prawnych dla systemów korzystających z wód kopalnianych

Closed systems allow to obtain heat by heat exchanger installed under the Earth surface, in which the medium has no direct contact with the environment (KAPUŚCIŃSKI, ROZDOCH, 2010). In the case of low-temperature geothermal energy for the closed system, the main legal document determining the possibilities of using groundwater is Geological Work Project prepared in accordance with the Regulation of the Minister of Environment from 19 December 2001 *about geological work programs* (Dz. U. Nr 153 poz. 1777). Implementation of the project refers to systems in which new boreholes are necessary – for installations using existing wells there is no need for a new project. Closed systems are not subject to Water Law or directly Environment Protection Law. Only according to Building Law, invest-

ments where the construction of new facilities is necessary the building permission is required; also the notification of casing the terrestrial of boreholes can be needed.

More complex regulations are related to open systems in which the water (medium) is pumped from boreholes, and after heat transfer in the heat pump is injected into the reservoir through a injection well or discharged to surface water or used for other purposes – there is also possibility to drain water into the mine workings (KAPUŚCIŃSKI, ROZDOCH, 2010). In case of open systems, the primary legal document is Geological Work Project prepared in accordance with Geological and Mining Law. It should be also considered whether the system applies to: water coming from the active mine, liquidated or

liquidated and non-deodorized. Open systems are also subject to the Water Law, based on which it is possible to obtain a water permission for: water consumption of more than 5 m³/d, water devices and discharge of water (waste water) into the reservoir or the surface water. In the case of water intake in excess of 10 m³/h additional decision on Environmental Conditions is required (MUCHA, 2011). On the basis of the Environmental Protection Law it is also necessary to pay extra fees for the discharged water (waste water), and in special cases, to monitor the quality of water discharged. Depending on the type of project related to the fact that the objects belongs to the mine areas or are not directly associated with mining plant, on the basis the Construction Law there shall be notification on the performance of casing groundwater intakes.

FINANCIAL SUPPORT PROGRAMS

Taking into account the requirements of the European Union (EU), mainly due to the increasing pollution of the environment, Member States are obliged under the Directive of the European Parliament and Council Directive 2009/28/EC of the 23 April 2009 (Official Journal of the EU. L. 140/16.5.6.2009), which is part of the Climate-Energy Package 3x20, to reduce greenhouse gas emissions by at least 20% compared to the year 1990, to reduce energy consumption by 20% and increase the share of renewable energy sources to 20% of the total gross energy consumption. In response to the EU demands, issued in the directive determining clear objectives concerning the environment, each of the Member States in recent years developed their own systems of support for investments connected with alternative energy sources in order to persuade potential investors to invest in projects related to renewable energy sources. In Poland, the financing sources generally can be divided into two groups: internal (domestic) funds and external (foreign), mainly funds from the European Union. In both cases funding occurs at two levels (central and regional), and it is based on the value of the investment. However, not all forms of support are related to installations which use heat pumps. An example of this might be the National Fund for Environmental Protection and Water Management in Warsaw (NFEP&WM), which so far does not provide funding for low-temperature geothermal systems offering funds only related to the deep geothermal energy such as geothermal heating plants. Subsidization or loans originating from internal funds for systems using heat pumps can be expected from the Regional Funds for Environmental Pro-

tection and Water Management (RFEP&WM), and Bank of Environmental Protection (BOŚ SA) offering preferential loans or subsidization for geothermal projects and their realization – including the heat pumps installations. In the case of foreign financial support for projects, their realizations and/or promotions, the main institutions are: the European Union including programs such as the Regional Operational Programs (ROPs), Program Infrastructure and Environment (OPI&E) or Intelligent Energy for Europe (IEE), as well as funds from the Financial Mechanism of the European Economic Area (EEA), or support from United Nations (UN) in the form of the Global Environment Fund (GEF). Detail specification is shown in tab. 1.

The forms of support have been developed also for mine waters, as exemplified the international project REMINING-LOWEX (European Revitalization Areas Mine) co-funded by the European Commission. Several countries took part in the project such as the Netherlands, Slovenia and Bulgarians as well as Poland making it possible to start the research to determine the possibility of using mine waters in Czeladz. The Polish project involved the heating of public buildings as well as houses and was conducted jointly by the city of Czeladz, the University of Silesia in Katowice and Spółka Restrukturyzacji Kopalń S.A. With the implementation of the project it was possible to raise awareness about the use of mine waters through systems based on low-temperature heat pumps as well as the sharing of experiences between the partners involved in the project (OSOWSKA, 2009).

SUMMARY

Taking into account the operating installations which obtain energy from mine waters, including the first Polish investments in Czeladz, the favorable legal conditions connected with the fact that obtaining heat from mine waters is not involve by additional fees, it can be concluded that mine waters are an alternative to obtain the heat in the case of mine areas. Further advantages of mine waters utilization is the fact that in order to obtain the heat it is possible to use the existing infrastructure such as mine shafts, mine workings, or existing boreholes, which also can reduce the investment costs. Moreover the financing sources which provide funding for low-temperature geothermal systems in form of subsidization or loans originating from internal funds or foreign financial support create an opportunity for faster development of that kind of investments.

Based on conducted studies on the possibilities of using mine waters in low-temperature geothermal

energy, and favorable legal conditions as well as the financial support for investments directly related to

Table 1. Types of financial support for heat pumps investments based on GÓRECKI et al. (2013)

Tabela 1. Rodzaje wsparcia finansowego dla inwestycji pomp ciepła na GÓRECKI i in. (2013)

Type of support	Beneficent	Domestic Institutions		Foreign Institutions				
				European Union			EEA Financial Mechanism	United Nations
		RFEF&WM	BOŚSA	ROPs	OPI&E	Intelligent Energy - Europe (IEE)		
Loans	Territorial government units	Projects / Realization	Realization					
	Entrepreneurs	Projects / Realization	Realization					
	Other Institutions	Projects / Realization	Realization					
	Natural persons	Projects / Realization	Realization					
Subsidi-zation	Territorial government units	Projects / Realization		Projects / Realization / Promotion	Projects / Realization / Promotion	Promotion	Projects / Realization	Projects / Realization
	Entrepreneurs	Projects / Realization		Projects / Realization / Promotion	Projects / Realization / Promotion	Promotion		Projects / Realization
	Other Institutions	Projects / Realization		Projects / Realization / Promotion	Projects / Realization / Promotion	Promotion		

the use of groundwater, it can be stated that the mine waters can contribute in the future to the increase in the use of geothermal energy, and the growth in the use of renewable energy in the country. It can be also concluded that the low-temperature geothermal provides a great opportunity for the use of water from abandoned mine workings in highly degraded areas in which the protection of the environment should be treated as a priority.

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